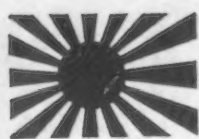
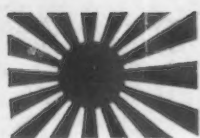


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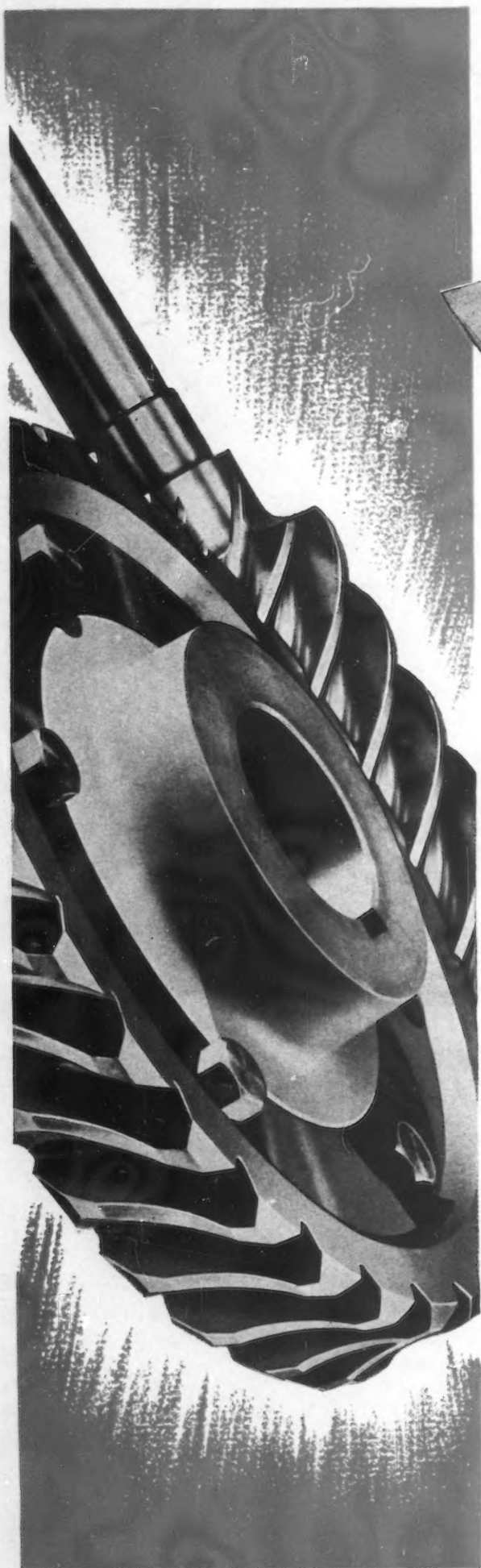
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Indexed in the Industrial Arts Index. Pub-
lished every Thursday. Subscription Price
North America, South America and U. S.
Possessions, \$8; Foreign, \$15 a year.
Single Copy, 35 cents. Annual Number, \$2.

Cable Address, "Ironage N. Y."

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AXIS TACTICS

A MILITARY strategist would unalterably advocate forcing one's enemy to fight a two-front war while his country and its allies maintained a single active fighting front. Divide and conquer. Whether it be the enemy's battle units, its production or morale front. Conversely, it is also true that unity is essential to victory.

During the past few weeks this nation has suffered a serious defeat. A second front has been launched against us and we have not been steeled to meet it. Our democratic forces have been pushed back in Mobile, Newark, Chester, Los Angeles, Beaumont and Detroit. While fighting a war of tremendous proportions against the foreign fascists with their ideology of race superiority, we have allowed the American duplicate to rise up against the Negro people of the United States.

Whether these race riots have been engendered by native or foreign fascists has not yet been determined, but that they are not spontaneous, sporadic outbreaks is all too clear.

They have started on the eve of the great offensive against this country's enemies. They have occurred in the industrial centers where ships and war materiel are being built. Centers that are remote from each other but connected by ties generated by the Berlin-Rome-Tokio line.

Management in this country would certainly not condone an act of sabotage in its plants. Nor would the management of a war plant foster conditions that would make such sabotage easy. It is relatively simple to protect our vital industries from physical acts of sabotage. Guards are placed around a war factory. Clearance for plant workers and visitors is required.

It is not so easy to protect ourselves from the subtle poisoning of our mental system. And the effects of this vicious infiltration are far more harmful to our nation than is property destruction.


How can we face our potential allies—the colonial people of the East—and say sincerely: "Rise up against the Japanese, we are your friends," when they have but to look at the treatment of our colored citizens.

The effect of the inflammatory pens and tongues of the Negro-baiters must be neutralized. Active measures must be taken to insure a clear understanding on the part of plant personnel that it is an intrinsic factor in winning a democratic war that Negro and white work together harmoniously for the common objective—victory over the Axis.

J. H. Van Deventer



The CREED of a GREAT AMERICAN

 I was born an American; I will live an American; I shall die an American; and I intend to perform the duties incumbent upon me in that character to the end of my career. I mean to do this, with absolute disregard of personal consequences. What are personal consequences? What is the individual man, with all the good or evil that may betide him, in comparison with the good or evil which may befall a great country in a crisis like this, and in the midst of great transactions which concern that country's fate? Let the consequences be what they will, I am careless. No man can suffer too much, and no man can fall too soon, if he suffer or if he fall in defense of the liberties and Constitution of his country.

Daniel Webster

We reproduce this creed of a great American in recognition of our employees, who are producing steel on Independence Day as on every other day of this war year. Like thousands of other workmen throughout the country, Inland steelmakers are patriotically performing the duties incumbent upon them as Americans—turning out steel to protect the freedom proclaimed 167 years ago.

Inland Steel Co.

● Hoarding of 50,000 tons of steel at Kaiser's Richmond No. 3 yard, confirmed by Maritime Commission auditors, supports charges made months ago by local WPB officials that the excess purchasing flaunted WPB authority and ganded-up distribution machinery. Kaiser intimated then Nelson and Wilson would not support charges, which subsequently petered out among the goiter ads.

● Despite recurring Washington reports that Brazil's National Steel Co., at Volte Redonda, will be completed late in 1943, the plant will not be operating until very late in 1945.

● Since National Steel is wholeheartedly supported by the Brazilian government, plans of Cia. Sidurgica Belgo Mineira to build a new mill at Monlevade have been killed. The Government doesn't like competition.

● Pre-plated steel sheet is showing a considerable spurt in popularity. Most dramatic recent utilization is the new zinc-plated steel pennies that look so much like dimes.

● Current newspaper headlines are reminiscent of Goebbels 1933 speech that, "No country compares with America in its social and racial tensions. We shall be able to play on many strings there."

● Practically all major plane makers are doing hush-hush work on the helicopter, but Nash-Kelvinator's recent Army contract marks first large scale production. Greyhound Bus has put in a straight-faced application for helicopter routes, with fares estimated at 4c. a mile, slightly lower than present airline rates and higher than Pullman.

● Continuous employment for 53 hr. and over per week is decidedly inimical to health and efficiency, and 40 to 44 hr. per week are optimum, according to available evidence as sifted by Dr. Sayre, Bureau of Mines.

● Permyron, a sprayed-on black coating for plain carbon steels, is reported by Vega Aircraft Laboratories to withstand 400 deg. F., 30 per cent elongation, and bending operations to minimum bend radii, and to equal or surpass standard coatings under average and severe corrosion.

● Reports that the Flying Fortress is being modified to carry 10 tons of bombs should be treated with reserve. The Fortress has internal capacity for 5000 lb. of bombs, and apparently the decision is to hang a 4000-lb. bomb under each wing. This would reduce the operating height about 8000 ft. and the cruising speed about 25 miles per hr.

● Hard wood shortage has throttled all Michigan charcoal blast furnaces but the one at Mancelona, which blows out permanently in October after practically a continuous run since 1880. A scheme is afoot to move the Welles, Mich., charcoal by-product plant and the small Pembroke, Florida furnace to the hardwood territory around Rusk, Texas. Both units are in good shape but WPB's enthusiasm is near-zero.

● Early Liberators used in the American air offensive were wide open to a dead head-on attack, and while bomber losses were mentioned, nothing was heard of Liberators coming home with a couple of corpses in the nose under the pilot's seat. The weakness was corrected somewhat by field modification and Liberators currently assembled here are, if anything, over-corrected.

● Chromate treatment to protect the surface of magnesium alloys ranks as preferred practice, but American experiments with aqueous solutions of certain halogen salts other than fluorides show promise. British experiments with steam and water treatment likewise have given good surface protection.

● 1903 style: The tailless Horten IV glider has just completed its test flights. It's the first German aircraft in which the pilot has a prone position. Pilot reported little fatigue after 8-hr. flight.

● Boron-containing steels continue to grow in importance. This is one war-accelerated metallurgical development that will definitely not fade with peace.

● The Australian industrial front, long discouraged, has 75 machine tool plants against five in 1939, and 188 tool and gage shops, turning out 26,000 units daily, against two or three in 1939.

Metallurgical Control Through

Calculated Hardenability

THE work of Marcus A. Grossmann on the subject "Hardenability Calculated from Chemical Composition" can be employed as a very valuable substitute for research facilities to analyze hardening characteristics. This is particularly useful at a time when most manufacturers have been forced to change from many of the previously accepted alloy compositions to those of different analyses in the interest of conservation of the more strategic materials.

The Grossmann work is outstanding for several reasons. It has been so carefully outlined, and the procedure involved in the development of results so explained, that the reader can easily imagine himself in the position of the experimenter and grasp the full intention of those who actually carried out the work.

From the standpoint of hardenability, the effect of each element normally associated as a constituent of alloy steels can be seen graphically for comparison and also to observe the result which can be expected by variation in the amount of each present.

While the hardenability of a steel as calculated by the Grossmann method is given as the ideal critical diameter of a round section, or the diameter in inches of a section which would be hardened to a composition of 50 per cent martensite at the center in the ideal quench, this figure cannot be estimated accurately unless the exact analysis, as well as the quenched grain size, and the severity of the quench are known. These factors, however, do not become so important when calculated hardenability is used as a means of control only and not as an initial prediction. (This will be explained in more detail under control measures.)

When consecutive lots of steel are obtained from one source and are subjected to identical heat treatment, the usual variables are greatly reduced and can be assumed constant without endangering control. It becomes possible to set up limits on the one vari-

able left (chemical composition) which will assure uniform results surprisingly well. It should be remembered, however, that small amounts of elements such as molybdenum, chromium, and nickel may be present in steels which do not contain them as a reported element. These small amounts of unreported residuals have a very definite influence on hardenability. Fortunately they are all on the side of increased hardenability and therefore are on the safe side when full hardening is desired. Many cases of erratic results after heat treatment can be traced to the effect of varying amounts of these residual elements.

When first using calculated hardenability as a means of control, it is advisable to check back over previous data in order to secure some background as to the response to heat treatment of various steels encountered. A tabulated record of chemical analysis, calculated hardenability, quench employed, drawing temperature required, and resulting hardness will do much in providing a preliminary picture on subsequent heat treatment. In addition to this data it is advisable to record as-quenched hardness, grain size, and, where possible, the results of any hardness traverses over the cross-section of quenched sections. A good supply of the above mentioned figures will be of considerable aid in showing how variations in hardenability can influence the heat treating process required to obtain the desired physical properties.

It is very probable that some samples of steel which have been difficult to heat treat to a suitable hardness range in combination with normal ductile properties will be found to have had a lower drawing temperature than usual for that class of steel and a lower calculated hardenability than the samples which did respond normally to heat treatment. If this is found to be the case, then it becomes apparent that if these samples with lower hardenability could have been eliminated, all results would have been relatively consistent. This fact can then become the basis of

the control by means of calculated hardenability.

The elimination of these low hardenability heats or lots does not necessarily mean the loss of the material. It can be diverted to use in smaller sections where a more drastic quench

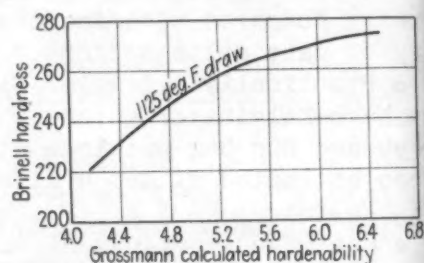


FIG. 1—Hardness vs. calculated hardenability for a given drawing temperature. As would be expected, hardness after a given draw temperature increases as hardenability increases, although not exactly proportionately.

can be used or where lower physical properties are required. On the other hand, those heats which have higher hardenability than normal for the group apparently contain more alloy than is necessary to produce desired results and could more economically be used on larger sections.

With a background of data for any one application it is possible to determine the hardenability which will be required for any other application and the control then becomes that of selecting steel with hardenability as near as possible to the desired figure.

When using and selecting NE steels, the calculated hardenability, in conjunction with past experience can provide a very good guide. If a certain part had been made of an SAE steel, it is advisable to select an NE steel with a hardenability equal to that of the SAE steel which had been

See the following articles in THE IRON AGE: "National Emergency Gear Steels," Aug. 6 and Aug. 13, 1942; "Physical Properties of NE Carburizing Steels," Sept. 17, 1942; "Martempering," Jan. 28 and Feb. 4, 1943; "Effect of Boron Containing Additions on NE Steels," March 25, 1943; and NE Steel-Standard Steel Chart, supplement to issue of May 6, 1943.

used. The NE steel could be expected

Hardenability

By W. R. PATTERSON
Metallurgist, National Supply Co.

to respond to heat treatment similarly and the physical properties would be comparable.

An example of a general application of calculated hardenability control follows this general procedure.

After sufficient preliminary work has been carried out to arrive at the general analysis for obtaining necessary properties, records should be compiled tabulating hardenability, draw temperature after suitable quench, and hardness. From these records a curve can be drawn showing hardness vs. calculated hardenability for any given draw tempera-

... The author here presents several neat and feasible applications of Grossmann's hardenability calculations as a means of prediction and control for steels of unfamiliar and varying analyses.

curves that become significant.

For any particular application where a constant hardness is desired in a number of pieces to be heat treated, a line of constant hardness such as the dotted line in Fig. 2 can be drawn and from the points obtained by the intersection of the constant hardness line with the various draw temperature curves, a separate

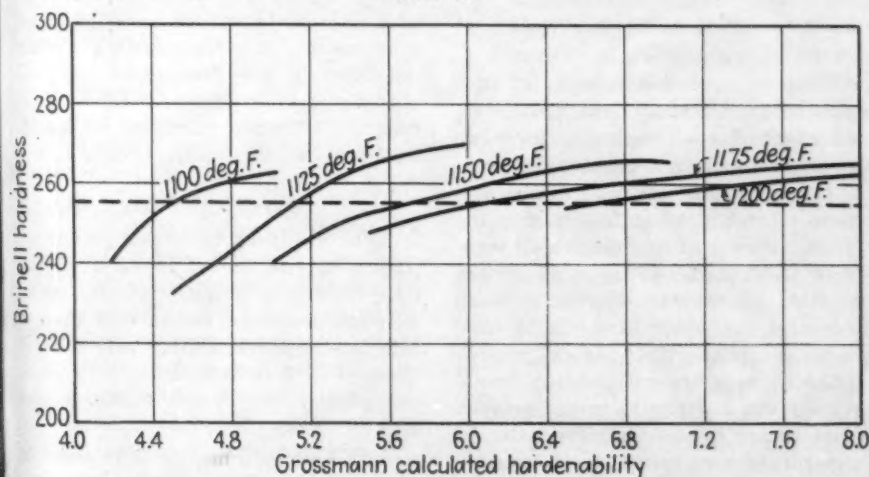
be avoided and better heat treating economy realized.

After sufficient data have been obtained to plot a wide range of drawing temperatures and hardenability, the resulting set of curves will cover most normal applications of constructional steels, and each job that confronts the steel treater will be represented by some section of the composite diagram.

It should be noted that up to this point the calculated hardenability has been used only as a method of grouping various lots or heats together which should respond similarly to heat treatment, and also as a method of predicting the drawing temperature to produce desired hardness. No mention is made of physical properties as it is first necessary to have a steel of proper chemical analysis and sufficient quality to produce the desired properties with the specified heat treatment. After these factors have been determined, the hardenability control aids in obtaining consistent results with the greatest economy.

If it is desired to use the calculated hardenability beyond the above procedure, an understanding of the

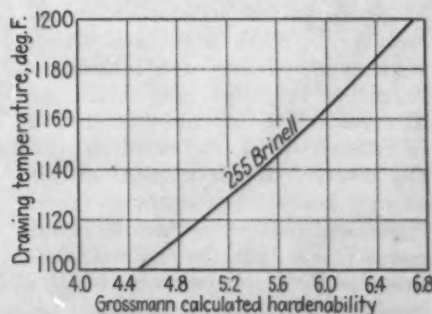
FIG. 2—A group of constant temperature curves. As hardenability increases, the drawing temperatures required to produce any level of hardness will increase, as indicated by the dotted line. Such generalities are here translated into definite values, however.



ture as shown in Fig. 1. If several drawing temperatures have been used for a given analysis, a similar curve can be plotted for each draw temperature, as in Fig. 2. As can be expected, the curve in Fig. 1 indicates that as the calculated hardenability increases, the hardness after any given draw temperature will increase although not exactly in proportion. Fig. 2 further indicates that as the hardenability increases, the drawing temperatures required to produce any level of hardness will increase. These facts are well known and it is the definite values represented by such

curve can be plotted which will show the drawing temperature necessary to give that desired hardness, knowing the calculated hardenability. Such a curve is shown in Fig. 3. With this curve it is possible to predict drawing temperatures beforehand, as soon as the analysis of the lot to be treated is known. It is also possible to segregate the various pieces or heats into groups which have the same or approximately the same hardenability, and which will be heat treated as a lot and given the draw which is indicated by the curve. Using this control method, much reheat treating can

FIG. 3—Drawing temperatures required to produce constant hardness with varying hardenability. This curve is constructed from the data given in Fig. 2.



Jominy or end-quench test is very helpful. In the end-quench test, to review briefly, a piece of steel is ma-

See "How to Interpret Jominy Test Results," Feb. 11, 1943.

chined into a round bar, usually three in. or more long, and one in. approximately in diameter with a suitable gripping arrangement at one end. This piece is heated to above the critical range, soaked for a short time, and quenched by a standard stream of water impinging on one end of the bar. The resulting hardness is measured by a Rockwell traverse from the quenched end along the length of the bar. The cooling rate of the material at 1300 deg. F. at any distance from the quenched end has been accurately determined and it is therefore possible to ascertain the hardness which obtained when the given sample is cooled at various rates.

It is therefore possible, after an end-quench test, to predict the maximum sized section which will quench out in either oil or water to give the desired hardness or structure at the center. If the size indicated by the end-quench test is smaller than the section of the piece to be treated, then it becomes apparent that with the quenching temperature and quenching medium to be employed, the desired results are very improbable. By raising the quenching temperature or by the use of a more severe quench, the hardness penetration may be increased. This also can be checked by varying the quenching temperature of the end-quench test and observing the change in result. Knowing ahead of time that the intended use of the material demands more hardenability than the steel possesses, it is possible to divert the heat of steel in question to some other service where less is required in hardenability.

Unfortunately not all steel treaters have the equipment or facilities to carry out their own end-quench test, nor are the results of such tests always available to them. It is here that the calculated hardenability can be used to great advantage as a satisfactory substitute. The application of calculated hardenability as a means of prediction of end-quench results, however, is much more involved and requires more data and information regarding the steel than when used as a control, as already described. It is necessary that the grain size and the severity of the quench, as well as the analysis be accurately determined and that these factors remain constant. If standardization along these lines is impossible, the calculated hardenability of each heat and

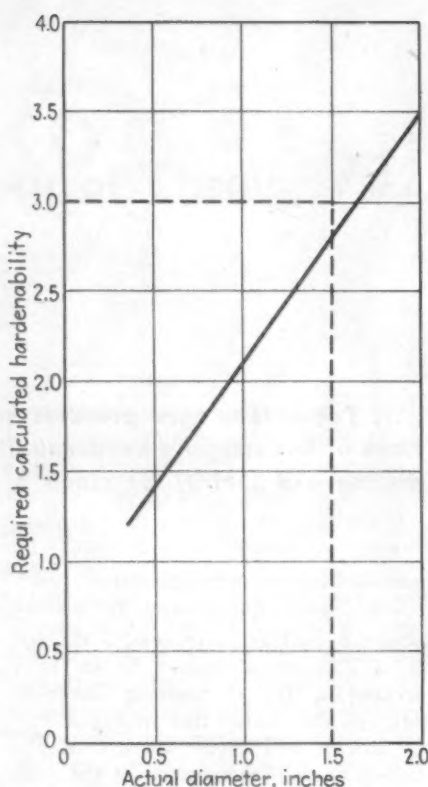


FIG. 4—Curve indicating required calculated hardenability to produce desired hardness penetration when sample of 2 in. diameter or less is quenched with an H factor of 1.0. Such a curve should be constructed for each quench tank.

the severity of each quench must be computed separately.

While the relative severity of each type of quench is general knowledge, the exact effect of each as referred to a common scale is necessary for accurate calculations. Asimow and Grossmann's procedure for determining the actual severity of any quenching technique is to quench three or more bars of steel of various diameters using the same procedure that will be used in actual production. After quenching, all pieces are cut through transversely and a hardness traverse taken from center to outside. The ratio of unhardened core to actual diameter is computed for each piece and these ratios plotted against diameter. By

See "Hardenability and Quenching" by Grossmann and Asimow, THE IRON AGE, May 2, 1940.

comparison with a master set of curves which have been worked out by Asimow and Grossmann, the severity of quench, or the H factor, can be determined.

The knowledge of the H factor for each quenching procedure employed by the steel treater serves as an excellent guide in itself without further application to calculated hardenability. For the benefit of those who are not in a position to determine experi-

mentally the H factor, these have been calculated for oil, water and brine with varying degrees of agitation and are available for general use. Actual values may vary slightly due to local conditions, but the use of the given figures seems to be entirely satisfactory for most purposes.

For those who are heat treating steels of various analyses using several different types of quenching procedure, a table giving calculated hardenability required for full hardening for a number of different sized sections in the various quenches can be used to great advantage. To compute such a table, it is first necessary to compute the relative severity of the quench for each quenching procedure employed. For example, suppose two water and two oil tanks are available, and that tank No. 1, filled with water and strongly agitated by mechanical means, has an H factor of 2; tank No. 2, filled with water and mildly agitated, has an H factor of 1.0; and the oil tanks, No. 3 strongly agitated, and No. 4 mildly circulated, have been found to have H factors of 0.7 and 0.3 respectively.

By referring to Grossman's curve of actual diameter vs. ideal diameter and making the necessary corrections for each quench, it is found that a rod of steel with a calculated hardenability of 2.0 (or an ideal diameter of 2 in.) would harden to 50 per cent martensite in the center when quenched in the four tanks, only if the diameter of the rod did not exceed 1.5 in. when quenched in No. 1, 1.2 in. in No. 2, 1.05 in. in No. 3, and 0.6 in. in No. 4.

Inversely, if a rod of 1 in. diameter is to be hardened to 50 per cent martensite in the center in each of the four quenches, it must be of a steel with an analysis which will give a calculated hardenability of 1.4 if quench No. 1 is to be used, 1.75 when quenched in No. 2, 1.95 in No. 3, and 2.75 in No. 4.

With such information it is possible to prepare a table showing the calculated hardenability necessary to harden properly various sized sections. Such a table can be prepared for each quenching procedure employed in the shop. Usually a structure which is more completely hardened than 50 per cent martensite is desired and this will, of course, cause a modification of the calculated hardenability. An increase of 20 per cent, for example, in the calculated hardenability can be assumed to give the desired increase in center hardness over that of 50 per cent martensite. Such assumption can be subsequently verified by cutting through a quenched

(CONTINUED ON PAGE 130)

Charcoal Pig Iron

By RALPH H. SWEETSER

Blast Furnace Consultant, New York

THE present critical shortage of charcoal pig iron, and also of charcoal itself (THE IRON AGE, April 22, 1943, p. 110), has focused attention on the diminishing supply of charcoal pig iron in this country and in Great Britain, and on the possibilities of the four charcoal blast furnaces still on the active list—sole survivors of 982 furnaces and three centuries of continuous operations. The pig iron of the charcoal furnaces has been shipped out and their iron yards are almost bare, as shown in Fig. 1, a photograph of a Michigan furnace, in March 1943. The furnace had been blown out in January.

There must be some inherent element of quality in a product that can live through all the technical advancements of the iron and steel industry, and still stand in this second year of total war at the top of the list of pig irons, "per gross ton," with a premium of \$7.34 above No. 2 foundry, Chicago. For the first 200 years of the iron industry in this country (beginning with the colonies) there was no such premium price, because there was no other kind of pig iron made; there was no blast furnace fuel except charcoal. Even ordnance in those days was made from charcoal pig iron.

In the present study by the authorities to find ways to keep the Michigan charcoal furnaces in blast in spite of the rapid receding of the frontiers of hardwood forests there arise three questions: What is the "it" in charcoal pig iron? Why has the production of charcoal pig iron decreased from the peak annual production of 628,145 tons in 1890 to less than 50,000 tons this year? Where should charcoal pig iron be made?

The Mysterious Something

If anyone has found the real

... The supply of charcoal pig iron is at low ebb, with only four furnaces still on the active list. Yet the author, delving into the mysterious and fascinating question of charcoal iron's elusive "something," concludes that it more than holds its own on its merits and that, through reforestation and intelligent location, the long saga of charcoal pig iron could continue.

answer to the first question he has not yet published it. Ever since other blast furnace fuels besides charcoal have been used, the technically minded makers and users of pig iron have been trying to find out why charcoal pig iron is superior to coke pig iron, and why it is that charcoal pig iron can be used as a "medicine" in a gray iron foundry and is so beneficial in malleable iron foundries. At a recent committee meeting in Washington one of the leading consultants in ferrous metallurgy said, "there is a mysterious something in charcoal pig iron that is not explained by its analysis. It does give to sheet mill rolls a density and polish that coke iron does not."

In the first place, all charcoal pig iron is merchant pig iron, or "iron in pigs," and with few exceptions has never been used for hot metal. One notable exception was the case at the Algoma Steel Co.'s No. 1 blast furnace (Fig. 3) where the charcoal pig iron went to the bessemer plant either direct or after being pigged at the pig casting machine.

Merchant pig iron has many varieties of "personality" (see "Merchant Pig Iron, a Quality Product," THE IRON AGE, Nov. 28, 1935). It has been found that "the fuel used in the blast furnace imparts to the pig iron

certain characteristics and qualities that are outside of the effects due to the constituents of that pig iron resulting from the chemical analysis of the raw materials smelted, and which are seemingly independent of the practice in handling the operation of the furnace."

This personality of a pig iron persists in all subsequent uses of the iron, whether it is hot metal made into steel or whether it is remelted and made into castings. That charcoal imparts a personality to pig iron far superior to that imparted by coke was strikingly demonstrated by W. E. Jominy, metallurgical engineer, Department of Engineering Research, University of Michigan, in the tests he made at Ann Arbor, the results of which were reported at the annual meeting of the American Foundrymen's Association, October, 1924, in his paper entitled, "Characteristics that Chemical Analysis Fails to Disclose in Pig Irons and Castings." In the tests made for showing the variation of breaking loads of irons on remelting, Jominy used charcoal and coke pig irons of similar chemical analysis. He found that the coke irons tested ranged in tensile strength from 17,100 lb. to 25,600 lb., while the charcoal iron samples ranged between 21,200 and 31,500 lb. per sq. in.

In the tests of charcoal irons having 1.90 and 1.91 per cent silicon, with a coke iron of 1.99 per cent silicon, the manganese, sulphur and phosphorus contents being nearly the same in all the samples, Jominy found the tensile strength of the charcoal irons to be 29,800 lb. and 29,900 lb. respectively, compared with 21,600 lb. for the coke pig iron. He says, "The same comparisons can be made between No. X74, a charcoal iron, which averages 28 per cent stronger than X38, a coke iron; No. X75, a charcoal iron which averages 40 per cent stronger than No. X4, a coke iron; and between No. X76, which averages 41 per cent stronger than No. X3, a coke iron. The outstanding differences which correspond to differences in strength between these irons is the process of manufacture."

Near the end of his paper Jominy says, "An important differential between these strong and weak irons has been noted. This is in the micro-structure. As was stated in the beginning of this paper over 100 irons have been examined in collecting these data. One of the most pronounced differences in all the specimens examined was the formation of the graphite flakes. These flakes in the weak irons are long and cut the matrix of ferrite at many angles. In the stronger irons, the graphite flakes are much smaller, and the ferrite has better continuity. . . . There is a distinct tendency for the coke irons to have large flakes and for the charcoal irons to have small flakes. . . . It is logical enough that the strength of the metal should vary with the size of the graphite flakes, but what

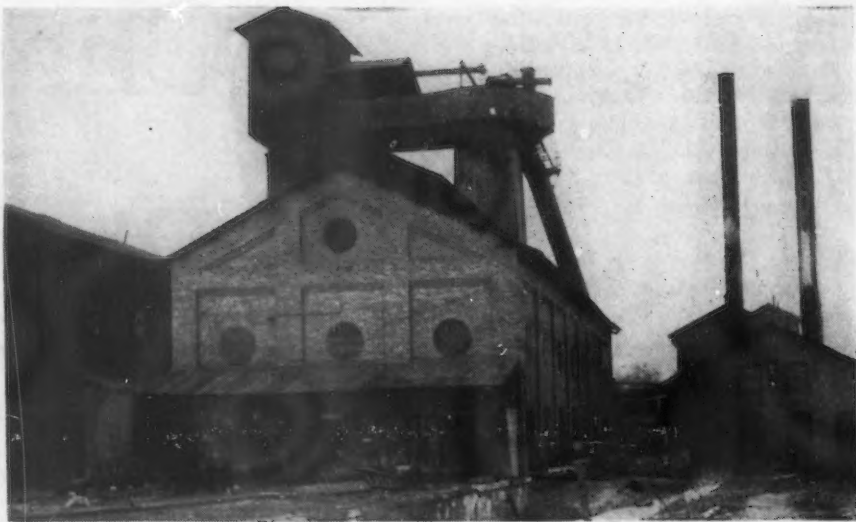


FIG. 1—A northern Michigan charcoal blast furnace, its yard virtually empty of iron in March, 1943, the furnace having been blown out in January. The hardwood forests for 50 miles around this furnace, at Welles, Mich., have been depleted.

causes the variation of the graphite flakes?"

The following year, at the Syracuse meeting of the American Foundrymen's Association there was presented a paper on "The Oxygen Content of Coke and Charcoal Cast Irons," by James R. Eckman and Louis Jordan of the Bureau of Standards, and Mr. Jominy. It had been thought by several metallurgists that the superior strength of charcoal pig iron was due to a higher oxygen content. Messrs. Eckman, Jordan and Jominy reported in their paper, "it is very evident that the stronger charcoal irons are not distinguished from the weaker coke irons by any higher content of oxygen." They further tested the irons for the influence of combined carbon, and re-

ported that, "It is evident that the combined carbon also fails to furnish any difference in chemical composition characteristic of the strong or weak irons."

In their search for the cause of the superiority of charcoal pig iron and the "general tendency of charcoal cast iron to exhibit greater strength and contain a finer and more nodular form of graphitic carbon than coke cast iron of similar composition, melted and cast under identical conditions," they analyzed the samples by chemistry and the spectroscope and failed to find the answer. They concluded their paper by saying, "Determinations of hydrogen, combined nitrogen, graphitic and combined carbon, and spectrographic analyses for minor metallic constituents likewise failed to reveal any differences in chemical composition which were characteristic of the charcoal and coke cast irons."

Evidently the scientific men have so far failed to discover that mysterious something in charcoal pig iron. Perhaps it is like the sunlight, we cannot explain just what it is, but we can see what it does. So, let us see what the practical foundrymen say about charcoal pig iron.

A Joint Committee on Pig Iron Qualities was organized in 1933 of representatives from five of the national engineering societies, including the American Society for Testing Materials, American Foundrymen's Association, American Institute of Mining and Metallurgical Engineers, Gray Iron Institute, and the Malleable Iron Research Institute. The author was one of the 15 members of the committee. From some of the

TABLE I
Average Annual Pig Iron Prices

Year	No. 2 Foundry, f.o.b. Chicago	Lake Superior Charcoal, Delivered Chicago	Premium
1942	\$24.00	\$31.34	\$7.34
1941	24.00	30.99	6.99
1940	23.04	30.38	7.34
1939	21.60	29.10	7.50
1938	22.25	29.34	7.09
1937	23.43	29.39	5.96
1936	19.60	25.35	5.75
1935	18.69	24.41	5.72
1934	18.23	23.88	5.65
1933	16.47	23.20	6.73
1932	15.84	23.06	7.22
1931	17.35	26.06	8.71
1930	18.47	27.04	8.57
1929	20.00	27.04	7.04
Average	\$20.21	\$27.18	\$6.97

letters sent in by users of charcoal pig iron the following comments are quoted:

"Our uses of charcoal iron are definitely for the purpose of producing high grade chilled iron castings for wear resistance. We use charcoal iron for the production of chilled iron castings primarily because we require a greater strength than is available in coke irons. . . . We also use it because the charcoal iron furnaces produce as a standard product the lower silicons (0.25 to 1.00 per cent) we require for varying depth of chills, whereas the coke furnaces offer such low silicon irons only as off-grade or misfit product."

In regard to the use of low carbon steel scrap for producing chilled castings, the chief metallurgist of one of the largest motor companies wrote, "It is my understanding that one of the chief uses of charcoal pig iron is to control the depth of chill on castings that are required to have a hard surface at certain points. The use of charcoal iron for this purpose could not be replaced by low carbon steel scrap because if low carbon steel scrap were added to increase the depth of chill, the total carbon content would be decreased in the iron with the result that the hardness of the chill would be considerably lessened."

Coming down to the present critical shortage of charcoal pig iron, the following extracts are from telegrams and letters sent to one of the leading makers of charcoal pig iron:

"Our inventory of charcoal iron for the manufacture of rolling mill rolls is very low; we are not receiving sufficient tonnage for our production. Hope you will do all possible to put your furnace back in blast."

"We are experiencing difficulty in

TABLE II
U. S. Charcoal Pig Iron Production

	Gross Tons	Average, Tons Per Year
From 1645 to 1699.....	27,400	500
From 1700 to 1799.....	722,500	7,225
From 1800 to 1899.....	26,954,678	269,546
From 1900 to 1936.....	9,528,314	257,522
From 1937 to 1942 inclusive.....	476,197	79,366
GRAND TOTAL 1645-1942 inclusive.....	37,709,089

From American Iron and Steel Institute			
1937.....	91,321	1940.....	86,370
1938.....	43,603	1941.....	100,896
1939.....	49,306	1942.....	104,701

procuring various grades charcoal pig iron necessary to successful production certain types rolls for steel, aluminum, brass and rubber industries. Important you arrange for adequate supply of charcoal to permit continuous operation of your furnace."

"We are desperately in need of charcoal iron. We are manufacturers of machine tools, all of which are for the war effort. Our inability to secure charcoal iron will naturally retard our production."

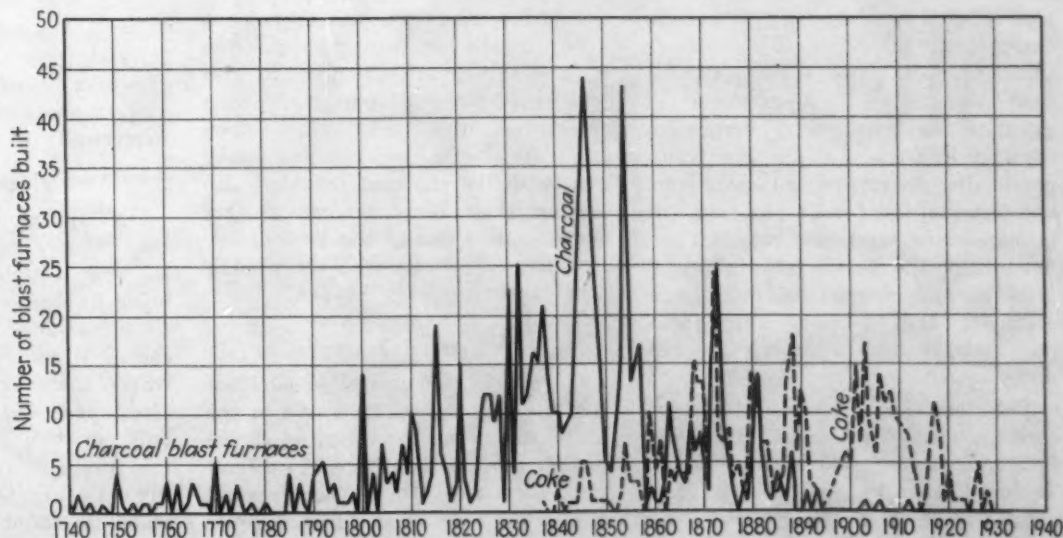
"We have been using this charcoal iron for several years in making these castings, and for the past few months, since this charcoal iron has not been available, our foundry scrap has increased quite appreciably, making quite a loss to us as well as making us unable to deliver our production as promptly as we should, and also being somewhat a waste of coke iron."

"We require charcoal pig iron to make caustic pots. The nature of the cast iron in these caustic pots is

such that the silicon content must be 0.50 per cent or lower in order to minimize corrosive attack by molten caustic soda. The section size of these castings is in the neighborhood of two to three inches. In order to obtain a favorable gray structure in the castings with the rate of cooling from the molten state which is developed, a sufficiently high total carbon content is necessary. The function of the charcoal iron is primarily to maintain a low silicon content without decrease in total carbon and without increase in the undesirable elements, sulphur and phosphorus."

"The writer has been in the malleable business for 35 years and all during this period has used a certain percentage of charcoal iron in the mix. Charcoal iron has certain characteristics which are, in our estimation, very necessary to the machinability of malleable iron, and, consequently, due to the fast machining of castings at this time, it is absolutely necessary to carry this type of iron."

FIG. 2—Charcoal and coke blast furnaces built each year since 1740. Compiled by the author from Tenth Census of U. S., American Iron Association, American Iron and Steel Institute, and other sources.



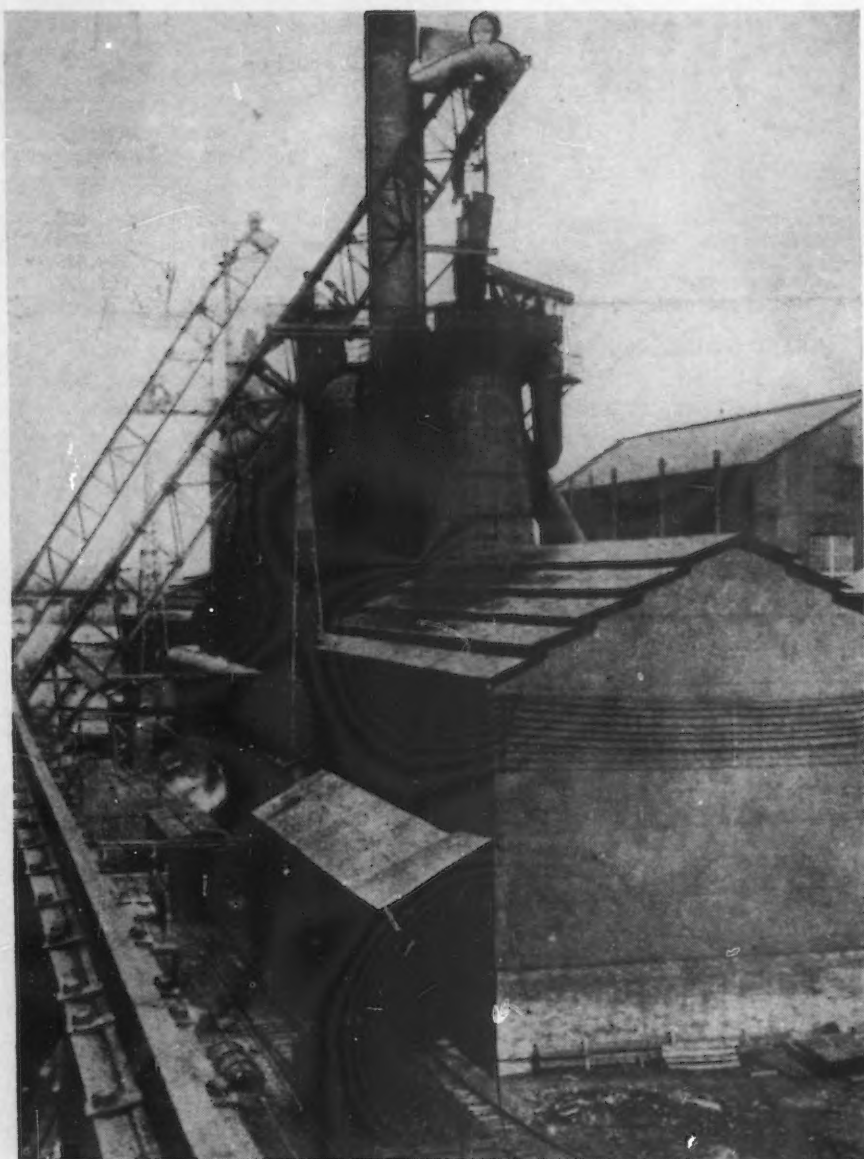


FIG. 3—The No. 1 blast furnace of Algoma Steel Corp., Sault Ste. Marie, Ontario. The largest charcoal blast furnace ever built, it held world output records. Iron from this furnace, contrary to usual practice, was used for hot metal, going directly or in pigs to the bessemer plant.

All these expressions about the "it" in charcoal pig iron, quoted above, ("A mysterious something," "certain characteristics," "tendency to have small flakes," "greater strength," "a finer and more nodular form of graphite carbon") go to emphasize the fact that charcoal pig iron has a personality distinctive and apart from the personality of coke pig iron. It is hereditary, and the prenatal influences of the hearth of a charcoal blast furnace impart to its iron a character that persists throughout its existence, and continues through many remeltings.

The late Dr. Richard Moldenke, eminent authority on cast iron and foundry practice, said at the "Round Table: Carbon in Pig Iron," A.I.M.E. annual meeting, February 1927, "So

far as the quality of the product is concerned, the history of the production of pig iron for foundry purposes is one of constant retrogression. The steps in this deterioration began with cold-blast charcoal pig iron, then anthracite iron, coke iron; then gradually warm to hot-blast coke iron, with the charcoal furnaces also heating their blast to get greater tonnages, and finally the present-day hot-blast coke irons with scrap additions to the ordinary burden."

Production Decrease

The building of new charcoal blast furnaces was especially active in the middle of the last century, as shown by Fig. 2, reproduced from *THE IRON AGE*, Nov. 29, 1934. The greatest number of new blast furnaces ever

built in a single year was 69 in 1854, when 43 charcoal blast furnaces, 16 anthracite, three raw coal and seven coke furnaces were erected, making a total of 736 blast furnaces on the active list at the end of that year. Of course they were small furnaces; the total pig iron production that year was 724,833 tons, of which 305,623 tons were charcoal pig iron and 303,067 anthracite. The next year anthracite tonnage surpassed that of charcoal iron. The tonnage of both these pig irons increased until the peak year of 1890.

Anthracite pig iron passed out during the first World War, but charcoal iron has persisted. Will it pass out during the second World War? The answer is emphatically, "No." In 1942 the production of charcoal pig iron was 104,701 tons, the highest since 1929, and it is now all melted. Charcoal is the only blast furnace fuel that can be replaced, and that by reforestation, the very thing that has not been done in the charcoal iron industry. When coking coal is mined, that is the end of it, it is irreplaceable. Cordwood could have been replaced, but it was not the custom where charcoal was primarily for blast furnace fuels. There are charcoal plants in Potter County, Pennsylvania, where there are more stands of cordwood than when the making of by-product charcoal was started at the end of the last century; the charcoal goes to the chemical and general market.

The disappearance of hardwood forests in the vicinity of the charcoal blast furnaces was the prime cause of the gradual decline of charcoal iron production. A secondary cause was the small output per unit; the largest charcoal blast furnace ever built (Fig. 3) made only 1000 tons per week, being limited by the amount of charcoal that could be supplied. Beehive coke was so cheap in the days when "slack" was considered only a waste product from the screened coal, that the coke furnaces outran the charcoal furnaces in tonnage in 1869 and numerically in 1885.

Place and Price

It is an axiom in the iron industry that the ore goes to the fuel. That is why Pittsburgh can afford to bring its iron ores such long distances to be smelted with its Pittsburgh coals. It can be done otherwise, and where there are loads both ways a strong iron and steel industry can be built up even where there is neither iron ore nor good coking coal; Chicago, Detroit and Cleveland are outstanding examples.

Obviously, charcoal pig iron should be made near the replaceable sources of hardwood in the vicinity of good low-cost iron ores.

Ever since there was another kind of pig iron besides charcoal pig iron in this country there has been a premium price on the charcoal iron. This difference in market price, now confined to only coke pig iron and charcoal pig iron and always to "iron in pigs" or merchant pig iron, has varied greatly in the first 100 years of such market quotations. James M. Swank, in his classic, "The Manufacture of Iron in All Ages," 1892, p. 514, gives the first comparative price list of charcoal and anthracite pig iron (the only kinds then made) beginning with the year 1842 when charcoal pig iron was quoted at \$28.00 per ton and "No. 1 anthracite foundry pig iron" at \$25.60, a spread of \$2.40 per ton.

This same table of Swank's quotes the prices of charcoal pig iron back to 1799 when the price was \$36.25 per ton. The price dropped to \$29.25 in 1803, and to \$26.75 in 1843, the lowest for that half century; it went to

\$53.75 in 1815. It is too bad that Swank could not find records of the tonnages produced during those years.

The average annual premium price of charcoal pig iron for the past 14 years is shown in Table I. The annual average prices are the arithmetical averages of the 12 months of each year, and have been taken from the market quotations of the trade papers.

The average premium for charcoal pig iron for the past 14 years has been \$6.97; the highest premium, \$8.71 per ton, was in the slump year of 1931. At the present time the premium is \$7.34, the price of No. 2 Foundry being set by OPA at \$24.00 and of charcoal pig iron at \$31.34, ever since June 24, 1941, when pig iron prices were frozen probably for the duration.

U. S. Production

In his book, p. 509, Swank says, "No tabulated statistics of the production of iron in our colonial history are extant, and the materials

for such a compilation appear to be entirely wanting; nor do the census statistics of the United States contain any reference to the industries of the country until 1810 . . . when there were 153 blast furnaces and 53,908 tons of cast iron made."

With such a handicap, it is only by approximate interpolation that an estimate of the charcoal pig iron tonnages can be made. Antedating the American Iron and Steel Institute was the American Iron and Steel Association with its very able secretary, James M. Swank, who furnished the iron and steel statistics for the tenth Census of the U. S. in 1880. Previous to Swank was John Peter Lesley, secretary of the American Iron Association, who published in 1859 his book, "The Iron Manufacturer's Guide to the Furnaces, Forges and Rolling Mills of the United States." By referring to the above authorities, and to others, including Wm. B. Phillips and John Birkinbine, the author has arrived at the total tonnage of charcoal pig iron made in the United States, shown in Table II.

Furnace Brazing of Form Tool Tips

CONSERVATION of critical high speed steel has been responsible for furnace brazing and hardening of high-speed steel tipped tools at General Electric's Schenectady Works. While the practice is not yet in full production, sufficient work has been done to predict its success.

The tool blank is first rough-machined and the recess to be tipped is ground. The high speed steel tool tip is then ground to meet the exact contour of the blank. This is to assure a definite all-over contact. The tip is then nickel plated and a 0.005-in. copper shim is inserted between the shank and tip. The tip is held in place with a piece of chrome nickel wire. Both tip and shank are then covered with a suitable flux, and the tool is ready for brazing and hardening.

This is done in a controlled atmosphere electric furnace, using Drycolene gas. Steels that have been treated in this gas are free from surface changes such as decarburization, carburization, or oxidation.

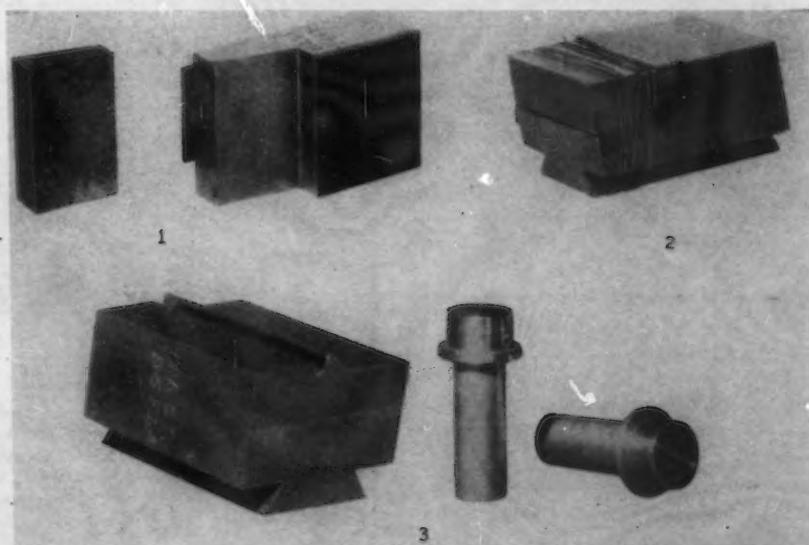
The brazing and hardening operations are done at and from the same temperature. The tool is put into the furnace without preheating. It is kept in the furnace long enough to heat up to a temperature of 2375 deg. F. (for molybdenum H.S. steel 2250

deg. is used). The tool is carefully removed from the furnace so as not to disturb the tip. It is then quenched in oil until it turns black (approximately 1100 deg. F.) and then cooled in still air.

The tool is then tempered 2 hr. at 1050 deg., air cooled and retempered 1 hr. at 1050 deg. and again air cooled. It is then finish ground.

Hardness tests of the high-speed steel tip indicate a hardness of 64-65 Rockwell "C". While no complete life tests have been made on tools thus far, tests of forming tools on stainless steels at 120 ft. per min. have been very satisfactory. Several other tools, such as reamers, planing tools, dovetailed forming tools and cut-off tools, are under test.

COMPOSITE dovetail forming tool. (1) High speed steel tip and nickel steel shank, (2) assembly prepared for furnace brazing and hardening and (3) completed tool and work produced by it.



The Annealing of Steel

By PETER PAYSON
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Crucible Steel Co. of America

... How to construct transformation-temperature-time curves for annealing is described in the second part of this article on application to annealing of the modern viewpoint on the transformation of austenite. Last week the author stated the principles which have superseded slow cooling, rule of thumb annealing. Three more parts of the article are to follow.

ALTHOUGH the procedures for measuring transformation rates have been discussed thoroughly,^{6 to 17} it is not amiss perhaps to discuss here at some length a method for determining the transformation characteristics of steels, since efficient annealing is so dependent on a knowledge of these characteristics. Actually, the method is fairly simple and most metallurgical laboratories have all the equipment that is needed.

Two or more small furnaces are desirable, but even one furnace is sufficient. Of utmost importance is the measurement of the temperature of the test pieces, and for this purpose it is necessary to place a thermocouple adjacent the sample in the furnace—a thermocouple placed near the top or back of a furnace is of little value for this work. A hardness tester, preferably a Rockwell or Vickers, and equipment for metallographic examination are all that are required to complete the job.

The samples of the steel to be studied may be of any convenient size. In the author's laboratory, pieces about $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{4}$ in., are used most frequently, but samples both smaller and larger have been used. These small pieces can be handled satisfac-

torily by properly designed tongs or by heat-resistant wire spirals, such as illustrated in Fig. 1, and described in a previous paper.¹¹ The samples should be in the natural or as forged condition, since this is ordinarily the prior condition of steel which is to be annealed. It has been found that the annealing reactions of samples which had been previously annealed, may differ appreciably from those of samples which had not been annealed, in regard to both structure and hardness.

It is well to point out here, in view of some skepticism on this subject which the author has encountered, that the data obtained by means of small samples heat treated in the laboratory are directly applicable not only to large forgings, but to large furnace loads of various sized bars. If the temperature conditions in the large forgings and the load of bars are the same as those of the small sample, the hardness and structure of the forgings and bars will be the same as those of the small sample. Naturally, the forgings and bars will require much longer times for heating to a definite temperature and for cooling to a definite temperature. But the reactions involved in annealing are only somewhat dependent on heating and cooling rates; they are dependent mainly on time at temperature. If the large mass (after it gets up to temperature) is held at the austenitizing temperature for the same length of time as the small sample, and then (after it gets down

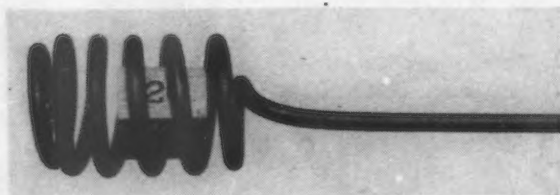


FIG. 1—"Spiral" used for handling TTT specimens. The 3/32-in. austenitic heat resistant wire is not much affected by repeated heatings and quenches. The loops are easily opened and closed with small pliers to insert and remove specimens, and the specimen in the closed loop can be quenched thoroughly.

to temperature) is held at the transformation temperature for the same length of time as the small sample, the end results must be practically the same in both. This has been demonstrated over and over again in the handling of thousands of tons of steel in commercial annealing practice. It is true that the variations in composition which occur across a large section cannot be duplicated in a laboratory-size test piece, but the results obtained on the small sample can nevertheless be applied to the handling of large masses, if a reasonable safety factor is used. During the last few years many large forgings, each about 40 x 40 in. and weighing about 45,000 lb., have been annealed on the basis of transformation data obtained with small laboratory samples. Not only has there been a very appreciable saving in the total time of the annealing operation over that which had been used before the adoption of the new method, but there has also been a marked improvement in the machinability of the forgings. This example should allay any doubt in the mind of the reader as to the practicability of transformation procedures for annealing. Experience will certainly eliminate this doubt.

It is desirable as a first step in the development of a transformation temperature time annealing cycle to know the critical temperature of the steel within about 25 deg. F. If this cannot be obtained from published data, it may be established quite satisfactorily by means of a series of small samples quenched in water from temperatures increasing at 25 deg. intervals from about 1150 deg. F. for steels containing over 3 per cent nickel; from about 1300 deg. F. for most low alloy steels; and from about 1400 deg. F. for high alloy tool steels, and hardenable stainless steels. Critical temperatures of a wide variety of steels are given in the TTT curves which are presented in this article, most of which will appear in Part IV, July 15.

When the critical temperature is known, the austenitizing temperature for a preliminary study of the transformation reactions can be arbitrarily selected at about 50 to 150 deg. F. higher than the critical. In this connection Rule 1 of annealing should be kept in mind, namely, that the closer the austenitizing temperature is to the critical temperature, the more likely is the structure of the annealed steel to be spheroidal and, conversely, the higher the austenitizing temperature, the more likely is the structure to be lamellar. For the

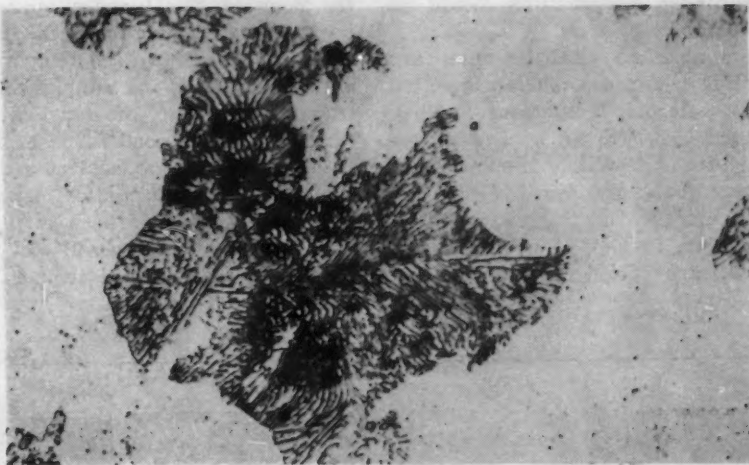


Fig. 2a

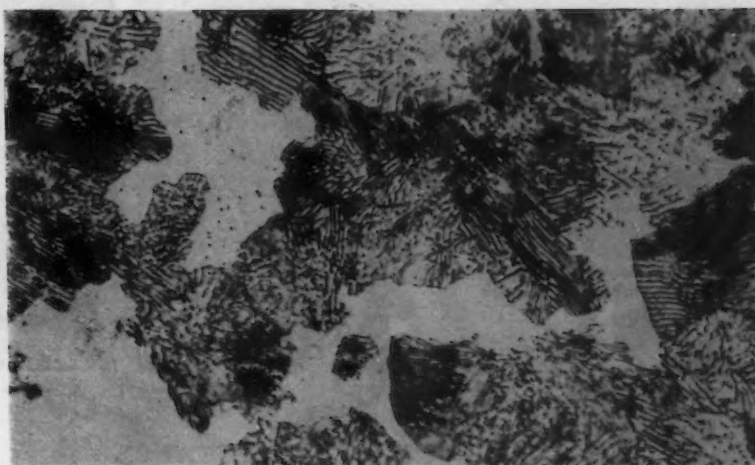


Fig. 2b



Fig. 2c

FIG. 2—Progress of transformation of E4160 samples austenitized at 1475 deg. F. for one hr., cooled to 1275 deg. in 20 min., then held at 1275 deg. and quenched in water. The specimen shown at top (2a) was held at 1275 deg. for 4 min. and has a Rockwell C hardness of 55. The specimen shown in 2b was held for 8 min. and has a Rockwell C hardness of 45. The bottom specimen (2c) was held for 30 min., and has a Rockwell C hardness of 19. Etched in nital; magnification 1000 diameters.

preliminary study, the time at the austenitizing temperature should be about 1 hr.

A number of small samples are placed in a furnace and austenitized at the selected temperature. They are then cooled to an arbitrarily selected transformation temperature, between 50 and 150 deg. F. below the critical, and held at this temperature. If only one furnace is available, the samples are cooled in the furnace,

with the heating units shut off and the door of the furnace opened to hasten the cooling somewhat. If another furnace or a high temperature bath is available, the samples may be transferred from the austenitizing furnace to the second furnace or the bath, which is being held at the subcritical or transformation temperature. The second furnace is preferable, since the samples will cool more rapidly to the specified temperature,

thus limiting the amount of transformation which may occur while the steel is cooling to the selected temperature.

After the samples have been cooled to the transformation temperature, they are held there and then, at successive time intervals, preferably in geometric progression—for instance, 5, 10, 20, 40, 80, and 160 minutes—a sample is quenched in water. The quenched samples are examined for

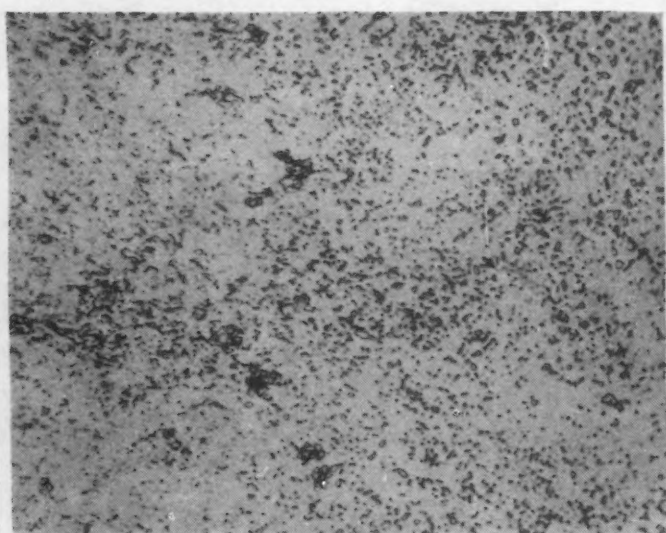


Fig. 3a

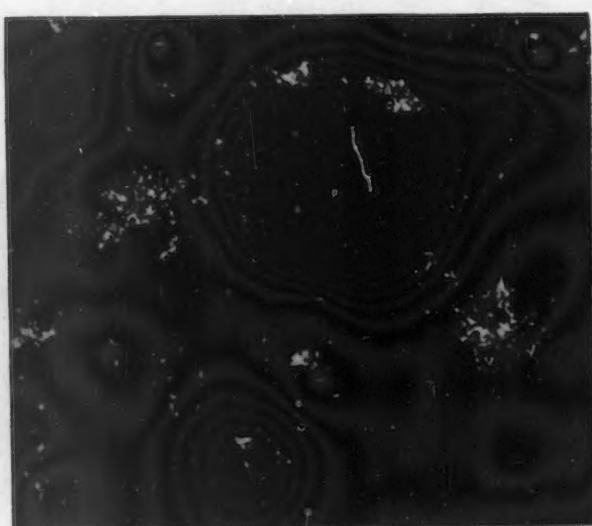


Fig. 3b

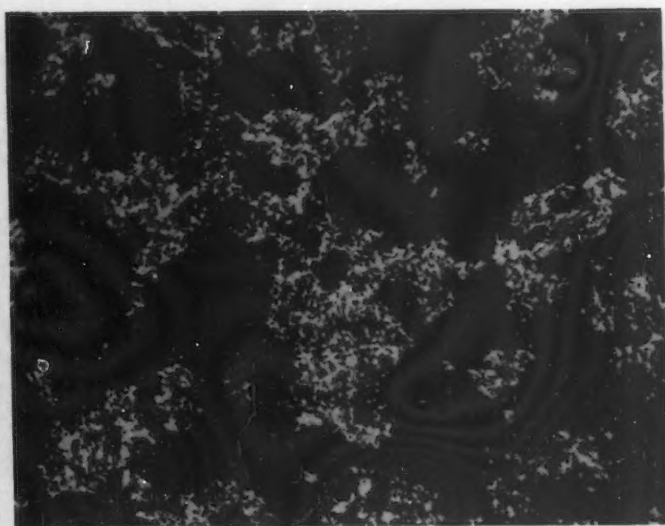


Fig. 3c

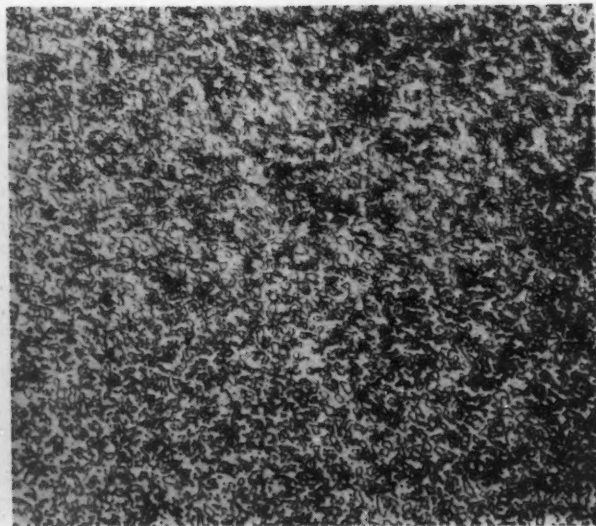


Fig. 3d

FIG. 3—Progress of transformation of Ketos oil hardening steel. Samples were austenitized at 1425 deg. F. for 1 hr., cooled to 1280 deg. in 15 min., and held at 1280 deg., then quenched in oil. Hardness was measured as quenched, then samples were tempered at 600 deg. F. for 1 min. to cause martensite to etch dark. The sample shown in photomicrograph 3a was held at 1280 deg. for 5 min., had a Rockwell C hardness of 63. The same sample is shown at right (3b) after temper. The sample shown in 3c was held 15 min., had a Rockwell C hardness of 58. The sample shown in 3d was held 3 hr., had a Rockwell C hardness of 19. Etched in nital; magnification 1000 diameters.

hardness and microstructure. If the holding time for any sample is insufficient for the beginning of the transformation, the hardness of that sample will be the same as that of a sample quenched directly from the austenitizing temperature and the structure will be completely martensitic. If the time is longer than necessary for complete transformation, the hardness will be low and the structure will be that of annealed steel, that is, a mixture of ferrite and relatively coarse spheroids or plates of carbides.

Three sets of photomicrographs are shown to illustrate the progress of transformation in three widely different steels. The first series represents E 4160 (Fig. 2); the second, Ketos, a Mn-Cr-W oil hardening tool steel (Fig. 3); and the third, Rex AA, an 18-4-1 high speed steel (Fig. 4).

Five small samples of E 4160 were austenitized for one hour at 1475 deg. F.—about 100 deg. above the critical—and cooled in the same furnace in about 20 min. to 1275 deg.—about 100 deg. below the critical. Two minutes after the samples had cooled to 1275 deg., one sample was quenched in water. The second sample was quenched 2 min. later, the third after it had been at 1275 deg. for 8 min., the fourth after 15 min., and the fifth after 30 min. All samples were tested for hardness and examined for microstructure. The sample which was quenched after only 2 min. at 1275 deg. F. was found to be 58 Rockwell C and fully martensitic. This established that during the cooling from 1475 deg. to 1275 deg. F., and the subsequent 2 min. holding period at 1275 deg., no recognizable change had taken place in the austenite which had been formed at 1475 deg. The results were exactly the same as if the sample had been quenched directly into water from 1475 deg. F. The second sample, which had been held at 1275 deg. F. for 4 min. before it was quenched, had a hardness of 55 Rockwell C and its structure contained a small amount of transformation product. This is illustrated in Fig. 2a. Most of the area is martensite, which means that the sample was still nearly all austenite at the time it was quenched. The small patches of pearlite represent the amount of austenite which had transformed between 2 and 4 min. holding time at 1275 deg. F. The hardness of the sample is not the hardness of either the martensite in the sample or the transformation product—it is the hardness of the mixture, and it serves to indi-

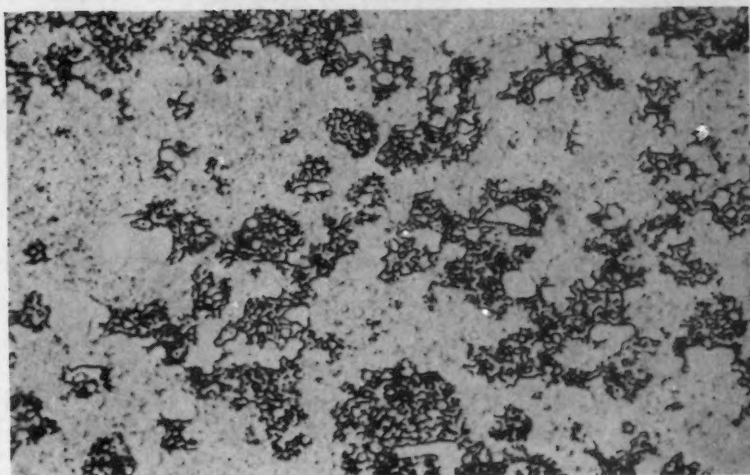


Fig. 4a

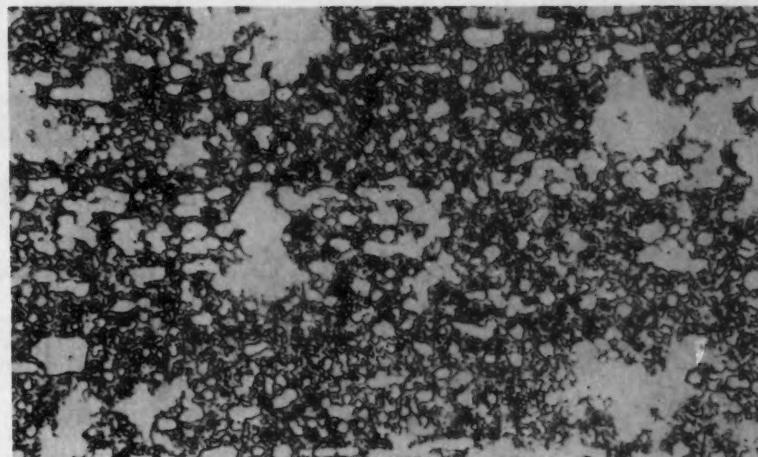


Fig. 4b

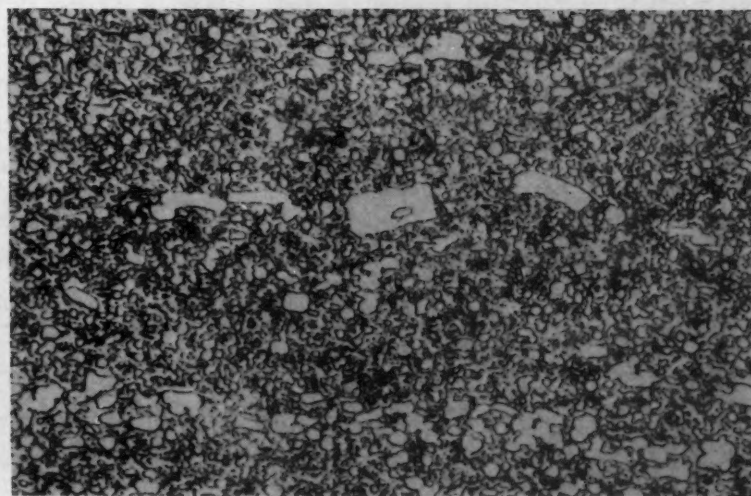


Fig. 4c

FIG. 4—Progress of transformation of Rex AA high speed steel. Samples were preheated at 1650 deg. F. for 1 hr., cooled to 1460 deg. in 20 min., then held at 1460 deg. and quenched in water. The sample shown at top (4a) was held at 1460 deg. for 30 min., had a Rockwell C hardness of 48. The 4b sample was held for 45 min., had a Rockwell C hardness of 33. The 4c sample was held for 3 hr., had a Rockwell C hardness of 21. Etched in 5 per cent nital; magnification 1000 diameters.

cate the relative amounts of untransformed product (that is, austenite which had changed to martensite during the quench) and transformed product in the sample. Figs 2b and 2c represent the samples which were quenched after being held at 1275 deg. F. for 8 and 30 min., respectively. They show a progressive change from the beginning of transformation in

something less than 4 min. (Fig. 2a) to completion of transformation in something less than 30 min. (Fig. 2c). The hardnesses of the samples decrease with increasing amounts of transformation product, and the hardness of the fifth sample, C19, is the hardness of the transformation product. The last sample, although it may not represent the best structure for

easy machining, is annealed steel. The annealing was accomplished in less than 2 hr. total time, without the use of slow cooling in any part of the operation and with a quench from 1275 deg. F. into water as the final step in the operation. Only relatively minor changes are necessary to produce in this steel a structure which is considered best for machining and these will be discussed in detail in a subsequent section.

Ketos, the second steel in the group mentioned above, has its critical at about 1370 deg. F. Since this steel like other tool steels, has best machinability when its structure is completely spheroidal, a relatively low austenitizing temperature—1425 deg. F., about 50 deg. above the critical—was selected for the preliminary study, in conformity with the first rule of annealing, namely, the lower the austenitizing temperature, the more likely is the transformation product to be spheroidal. Also, for the preliminary survey, a relatively high transformation temperature—1320 deg. F., about 50 deg. below the critical—was selected in conformity with the second rule of annealing, namely, the higher the transformation temperature, the more likely is the transformation product to be spheroidal. A number of small samples were then austenitized at 1425 deg. for 1 hr., cooled to 1320 deg. F. in about 10 min., held at 1320 deg. for various intervals of time up to 15 hr. and quenched in water. All these samples were found to be fully martensitic, which meant that this steel does not begin to transform even after 15 hr. at a temperature about 50 deg. F. below the critical. In conformity with the third rule of annealing, namely, that the time for completion of transformation decrease with decreasing temperature, a lower transformation temperature, 1280 deg. F., was selected for the next series of samples. Again five small samples were austenitized at 1425 deg. for 1 hr., cooled in the same furnace to 1280 deg. F. in about 15 min., and held at 1280 deg. F. for 1, 5 and 15 min., 1 hr., and 3 hr., respectively and quenched in water. The first sample was fully martensitic. The sample which had been held for 1 min. at 1280 deg. F. was 63 Rockwell C and showed a small amount of transformation product (Fig. 3a). The transformation product is ferrite plus fairly coarse spheroidal carbides. Since the martensite has associated with it small carbides which had not dissolved in the austenite at 1425 deg. F., and since it is light etching, it is the ferrite, it is somewhat difficult in this photomicrograph to distinguish from the martensite. The quenching medium was water, and the samples were polished and etched in 600 deg. F. for 10 min. The first sample was fully martensitic. The sample which had been held for 1 min. at 1280 deg. F. was 63 Rockwell C and showed a small amount of transformation product (Fig. 3a). The transformation product is ferrite plus fairly coarse spheroidal carbides. Since the martensite has associated with it small carbides which had not dissolved in the austenite at 1425 deg. F., and since it is light etching, it is the ferrite, it is somewhat difficult in this photomicrograph to distinguish from the martensite.

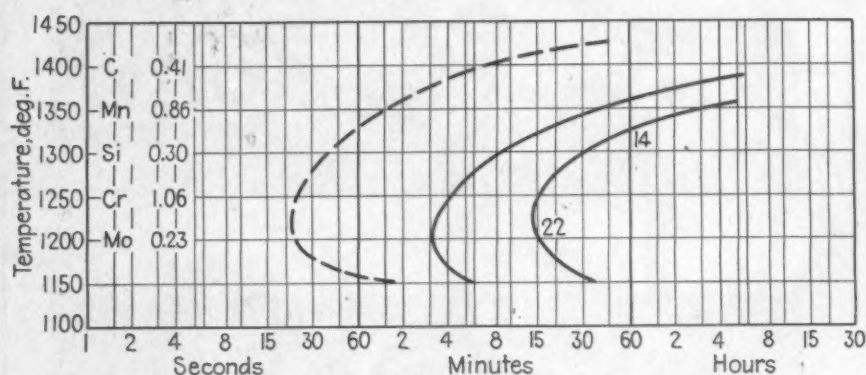


FIG. 5—High temperature portion of a TTT chart for A4142 steel, similar to the steel shown in Fig. 2. Austenitizing temperature, 1500 deg. F.; Acl temperature 1350 deg.; prior condition, as-rolled.

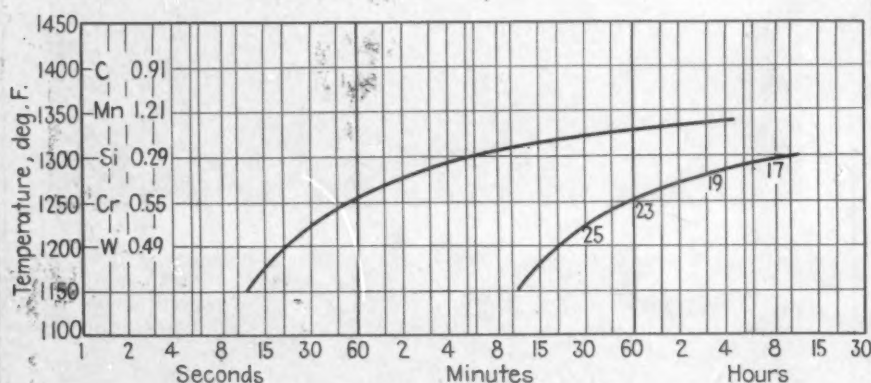


FIG. 6—High temperature portion of a TTT chart for Ketos steel. (See Fig. 3.) Austenitizing temperature, 1425 deg.; Acl temperature, 1370 deg.; prior condition, natural.

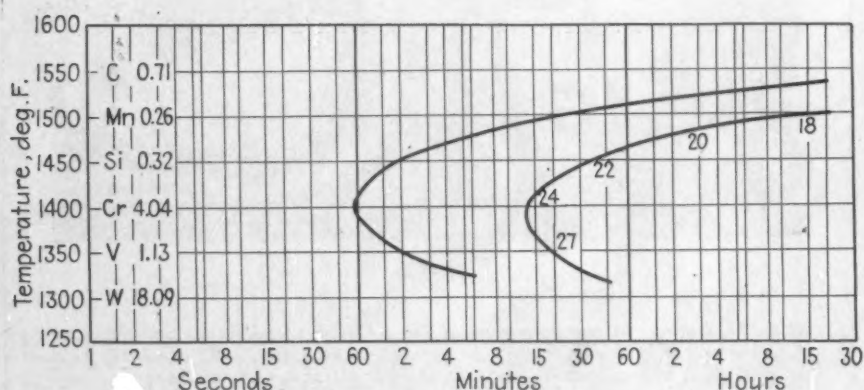


FIG. 7—High temperature portion of a TTT chart for Rex AA high speed steel. (See Fig. 4.) Austenitizing temperature, 1650 deg.; Acl temperature, 1545 deg.; prior condition, tempered 1500 deg. for 2 hr.

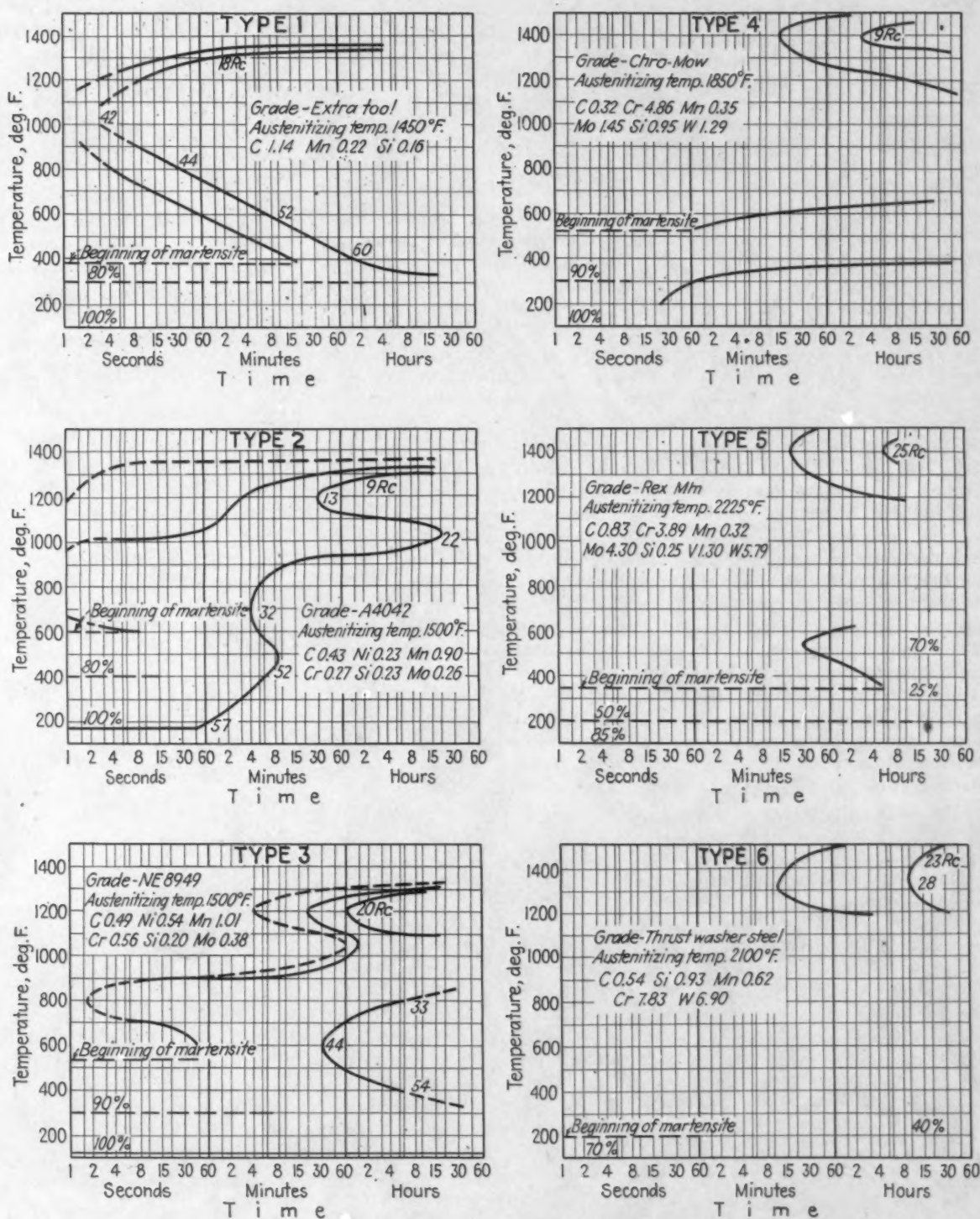


FIG. 8—Various types of TTT curves. Type 1 represents plain carbon steel; Type 2, A 4042 steel; Type 3, NE 8949 steel; Type 4, a 5 per cent chromium, hot-work die steel; Type 5, a high speed tool steel; Type 6, an 8 per cent chromium, 7 per cent tungsten steel.

guish the transformation product from the martensite. However, when the quenched sample is tempered at 600 deg. F. for about 1 min., and then polished and etched, the tempered martensite etches very dark but the ferrite, being unaffected by the tempering treatment, remains light etch-

ing. After this procedure, the transformation product is very easily distinguished from the martensite, and the progress of transformation may be followed readily, as shown in Figs. 3b, 3c and 3d. The sample which had been quenched after 3 hr. holding at 1280 deg. F. had a completely spher-

oidal structure and a hardness of 19 Rockwell C. This represents annealed steel completely spheroidized. The annealing operation was completed in less than 6 hr. and, again, the operation did not include slow cooling. It is admitted that 19 Rockwell C is not as soft as most consumers like to have

this steel for easy machining, but lower hardness may be obtained without slow cooling by applying Rule 6, or 7, of annealing which will be discussed in detail in a subsequent section. (Rule 3 states that to assure a minimum of lamellar pearlite in medium carbon steels, the steel should be preheated below the critical before austenitizing; Rule 7 states that for minimum hardness in hypereutectoid alloy tool steels, the steel should be heated for a long time at the austenitizing temperature.)

The third steel chosen to illustrate the procedure used to set up a TTT curve for annealing is Rex AA, 18-4-1 high speed steel. This steel has its critical at about 1540 deg. F. For austenitizing, a temperature about 100 deg. F. over the critical, namely, 1650 deg., was selected. For transformation, a temperature somewhat less than 100 deg. below the critical, namely, 1460 deg., was used. As before, samples were austenitized for 1 hr. at 1650 deg. cooled in the furnace in about 20 min. to 1460 deg., and quenched in water after successively longer holding periods at 1460 deg. Transformation was found to start in about 5 min. and was complete in about 3 hr. Fig. 4 shows the progress of this transformation. Here, the transformation product, ferrite and relatively fine spheroids of carbide, etches dark in contrast to the martensite (representing the untransformed austenite) and numerous residual carbides, which etch light. The hardness of the last sample, quenched after a holding period of 3 hr., was 21 Rockwell C, which is practically the hardness of annealed high speed steel. Again this annealing was completed in a relatively short time, without benefit of slow cooling, and the sample which was 21 Rockwell C was quenched in water from 1460 deg. F. at the finish of the operation.

So far, for each grade of steel, the progress of transformation at only one temperature has been discussed. In the same manner, transformation behaviors at other temperatures are established until data are available for each grade of steel covering a range of temperature from the critical down to about 200 deg. or 250 deg. F. below the critical. From these data, points are plotted on a transformation temperature time chart, indicating the times for the beginning and the end of transformation at a series of temperatures, and curves are drawn through the beginning points and through the end points. Lines through these points are referred to as transformation temperature time

curves, or TTT curves, or triple T curves. In these charts, time is plotted on a logarithmic scale so that times of 1 min. or less, as well as times of 15 hr. or more, can be fitted into a reasonable space and yet permit an open scale in the region of short times. The high temperature portions of the TTT curves of three steels similar to those just discussed are shown in Figs. 5, 6 and 7.

Although only high temperature transformations are of importance in annealing operations, it seems desirable at this point to discuss briefly the complete curves for transformations from the critical temperature down to room temperature. As has been mentioned previously, the austenites of different steels may have widely different transformation behaviors, and consequently the TTT curves depicting these behaviors may have widely different shapes. The curves of the steels studied so far may be divided generally into six types, which are illustrated in Fig. 8. Type 1, represented by plain carbon tool steel, is the simple S shape which has a region of gradually decreasing transformation times from the critical temperature down to about 1000 deg. F., then a region of gradually increasing transformation times from 1000 deg. down to about 400 deg., and, finally, the martensite reaction from about 400 deg. down to room temperature. The reactions in the lower part of the curve are discussed fully in a recent paper.¹⁸ Type 2, represented by A 4042, has a region of decreasing transformation times from the critical temperature down to about 1200 deg., then a region of increasing times from 1200 deg. down to about 1000 deg., then another region of decreasing times from 1000 deg. to about 600 deg., followed by the martensite and bainite reactions below 600 deg. It should be noted that in the temperature range from about 1100 to 900 deg., Type 1 steels have very rapid reactions, and Type 2 steels have definitely retarded reactions. It appears reasonable to conclude that the relatively small amounts of manganese, nickel, chromium and molybdenum, in the austenite of A 4042 have caused the middle part of the curve to be shifted appreciably to the right. Type 3 curve, represented by NE 8949, a somewhat higher alloy steel than A 4042, is similar to Type 2, except that the middle portion is shifted further to the right—so much so, that transformations in the region from about 1100 to 900 deg. F. are not completed even after about 20 hr. The Type 4 curve, represented by the 5 per cent chromium,

hot-work die steel, Chro-Mow, has the middle portion shifted so far to the right that over the entire region from about 1200 to 700 deg. F., there is not even the beginning of transformation in more than 20 hr. The Type 5 curve, represented by the high speed tool steel, Rex MM, is similar to the Type 4 curve, except that the beginning of transformation at temperatures below 600 deg. F. is further retarded. In the Type 6 curve, represented by an 8 per cent chromium, 7 per cent tungsten steel, transformation does not take place at all from 1200 deg. down to the martensite temperature, at least for times up to 20 hr. Finally, it may be said that there is still another type of curve, represented by the chromium-nickel stainless steels, in which transformations at both high and low temperatures are moved off to relatively long times.

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- ⁵ R. M. Parke and A. J. Herzig, "Hardening of Molybdenum SAE Steels," Metals and Alloys, vol. 11, pp. 6 to 13.
- ⁶ P. Payson, W. L. Hodapp, and J. L. Leeder, "The Spheroidizing of Steel by Isothermal Transformation," Trans. ASM, vol. 28, 1940, pp. 306 to 329.
- ⁷ P. Payson, U. S. Patent 2,183,155, January, 1940.
- ⁸ P. Payson, U. S. Patent 2,251,339, August, 1941.
- ⁹ J. R. Blanchard, R. M. Parke, and A. J. Herzig, "The Effect of Molybdenum on the Isothermal Subcritical Transformation of Austenite in Low and Medium Carbon Steels," Trans. ASM, vol. 29, 1941, pp. 317 to 335.
- ¹⁰ R. A. Flinn, Earnshaw Cook and J. A. Fellows, "A Quantitative Study of Austenite Transformation," Trans. ASM, vol. 31, 1943, pp. 41 to 70.
- ¹¹ P. Payson and J. L. Klein, "The Hardening of Tool Steel," Trans. ASM, vol. 31, 1943, pp. 218 to 256.
- ¹² J. R. Blanchard, R. M. Parke and A. J. Herzig, "The Effect of Molybdenum on the Isothermal Subcritical Transformation of Austenite in Eutectoid and Hypereutectoid Steels," ASM, preprint, October, 1942.

Editor's Note: In the third part of this article, to appear next week, the author discusses the correlation between transformation at constant temperature and transformation during continuous cooling.

Kinner Motor Kinks

• • • A few shots of out-of-the-ordinary machine tool set-ups at Kinner Motors, Inc., Glendale, Calif., manufacturers of light aircraft engines.



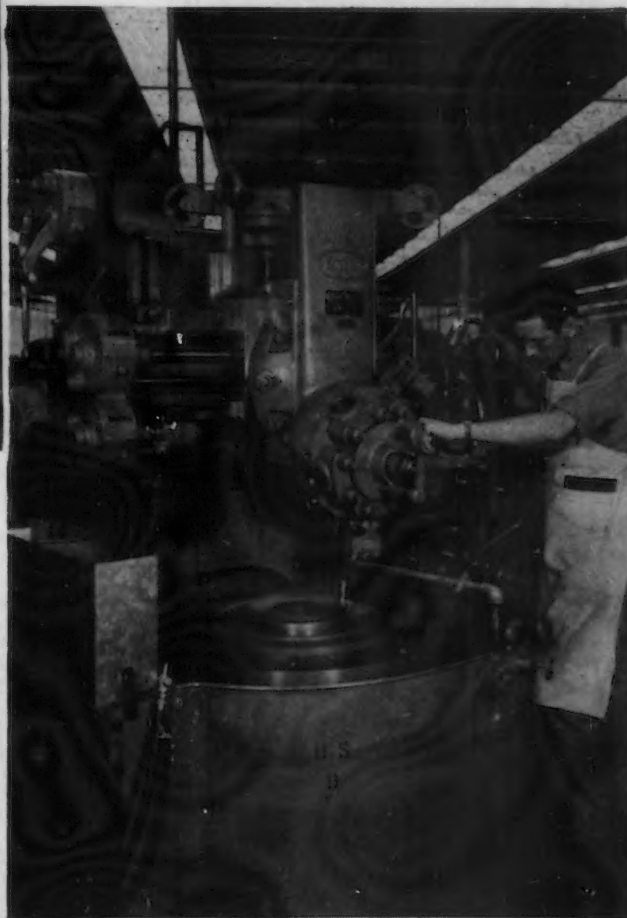
ABOVE

DOMING of the combustion chamber in aluminum cylinder heads is performed in this ram type turret lathe. A special pivoted tool holder is mounted on one turret face and the doming tool is rocked through the arc by a cam wedge bar mounted on the cross-slide carriage, thus generating a spherical section.

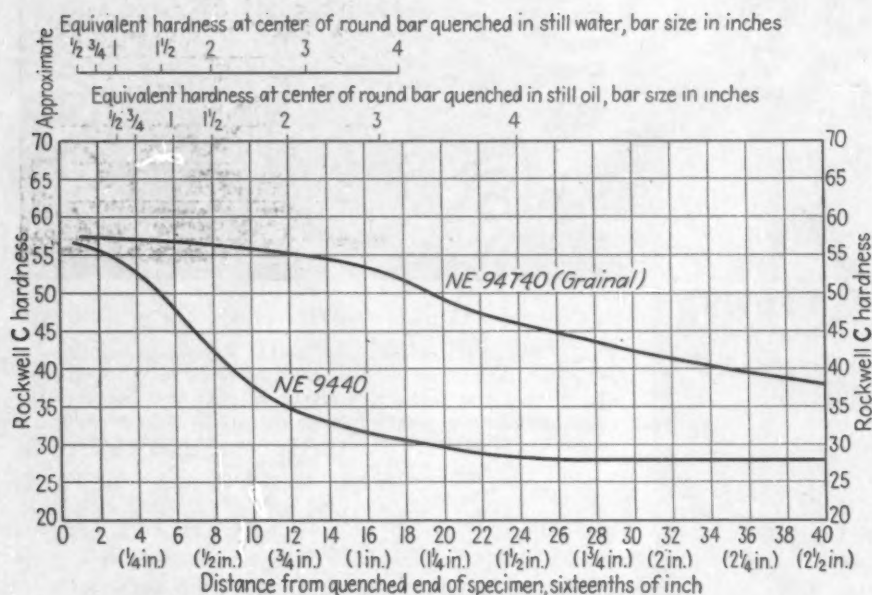
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BELOW

A 45-DEG. bevel is being cut on a steel bearing ring by setting both the cross feed of the head and the vertical feed of the turret at the same rate on this Bullard vertical turret lathe.



Intensifying of NE 9440 Steel



JOMINY hardenability curves for NE 9440 and NE 94T40 (Grainal-treated) steels, quenched at 1550 deg. F.

TABLE I

Test Data for 0.530 in. Round Bars of NE 9440 and NE 94T40 (Grainal-Treated) Steel Drawn at 400 Deg. to 900 Deg. F. (Bars normalized 1/2 hr. at 1650 deg. F., given preliminary machinery, and quenched in oil 20 min. at 1500 deg. F.)

	C	Mn	Si	S	P	Cr	Ni	Mo	A.S.T.M. Grain Size
NE 9440	0.44	1.12	0.46	0.025	0.023	0.30	0.31	0.12	6-8
NE 94T40 (Grainal)	0.44	1.05	0.50	0.025	0.021	0.30	0.31	0.14	6-7

Temper. Deg. F.	Type	Yield point	Tensile strength	Elongation	R.A.	B.H.N.	Izod	"P" Value*
400	NE 9440	236,200	294,950	10.0	35.4	546	9.2	101.5
	NE 94T40	216,350	286,900	12.3	46.5	545	22.8	113.0
500	NE 9440	238,300	280,450	9.8	41.3	516	6.4	106.0
	NE 94T40	234,800	275,900	11.5	46.2	506	17.6	111.0
600	NE 9440	230,350	256,450	11.3	47.3	480	5.0	108.0
	NE 94T40	230,050	252,500	12.0	51.6	482	16.0	112.5
700	NE 9440	210,550	228,300	11.0	48.8	444	9.3	104.0
	NE 94T40	208,600	224,350	12.0	52.5	437	15.8	108.0
800	NE 9440	190,300	201,050	12.5	52.7	412	20.6	103.0
	NE 94T40	188,400	196,650	13.0	54.8	397	31.3	105.0
900	NE 9440	167,750	175,700	13.8	52.3	362	42.5	98.0
	NE 94T40	162,500	172,000	14.8	57.0	354	47.9	103.0

* The "P" value is calculated from the formula: $P = \frac{TS + 6000RA}{5000}$ and serves as a toughness-strength factor.

THE effect of the addition of Grainal on the Jominy hardenability, tensile properties, and impact strength, including tests at low temperature, of NE 9440 steel, are shown in the accompanying chart and tables, the results of investigation by Vanadium Corp. of America in line with WPB's request that intensifying alloy effects be studied.

The samples used in these tests represent both untreated and Grainal-treated (4 lb. per gross ton) ingots from the same commercial basic open hearth heat. The base heat to which the addition was made was of very high quality; nevertheless the data indicate further improvement in the Grainal-treated steel.

Specifications for steels of this general class, carbon and very low alloy steels with intensifying additions, have recently been published as Ordinance Dept., U. S. Army Tentative Specification AXS 930 (March 30, 1943). The steel described here more than meets the requirements of Grade WD 94T40.

Other articles on intensifying and addition agents containing boron appeared in THE IRON AGE, issues of Nov. 19, 1942; Feb. 4 and March 25, 1943.

The effect of the Grainal addition in increasing the capacity for hardening of this base steel composition is apparent from the Jominy curve. Whereas, in the untreated steel a Rockwell C hardness of 50 was obtained at 0.31 in. from the quenched end of the Jominy bar, in the case of the Grainal-treated steel this was extended to 1.22 in. For a Rockwell C reading of 40, the distances were 0.56 in. in the case of the untreated steel, and 2.17 in. in the case of the treated steel. It thus appears that the application of the NE 9440 specification may be extended, by means of Grainal treatment, to include quenched and tempered machine parts for which the untreated steel would be unsuitable.

The effect of the Grainal treatment on the tensile and Izod impact properties after various tempering temperatures is shown in Tables I and II.

Values for the tensile test are the average of the results from two test bars. The Izod values are the average of four tests, two notches per test bar. Keyhole notch Charpy specimens were

TABLE III

Surface Hardness of 1 in. Rounds, Oil Quenched

Oil Quench, Deg. F.	Brinell Hardness	
	NE 9440	NE 94T40 (Grainal)
1300	200	217
1400	444	507
1450	522	551
1475	514	555
1500	522	555
1525	514	555
1550	514	555
1575	514	551
1600	534	555
1650	514	514
1700	495	555

used for the low temperature tests; the values quoted are averages from two test bars.

The data in Table I are from test bars heat-treated from 0.530 in. diameter section and tempered from 400 deg. F. to 900 deg. F.; those in Table II are from a series heat-treated in bars of 1 in. diameter section and tempered from 800 deg. F. to 1300 deg. F.

When both the untreated and Grainal-treated steels harden fully, as in small sections, the Grainal-treated steel is superior in toughness. The improvement is observed at all tempering temperatures, but is especially high at the lower temperatures. This improvement in the ductility factors persists to a substantial, though decreasing, amount even following tempering in the upper ranges of temperature.

Table III shows surface hardness results on 1 in. rounds oil quenched from various temperatures. The Grainal-treated steel has more uniform hardness above 1450 deg. F., and also has about 40 brinell units higher hardness in the as-quenched condition than the untreated steel.

In view of the growing importance of low temperature properties, the data in Table IV are of interest. The results cover a range of hardness for quenched and tempered plain and Grainal-treated 9440 steels.

TABLE II

Test Data for 1 in. Round Bars of NE 9440 and NE 94T40 (Grainal-Treated) Steel, Drawn at 800 Deg. to 1300 Deg. (The bars had been normalized 1/2 hr. at 1650 deg. F., and quenched in oil 1/2 hr. at 1525 deg. F. They were machined after tempering.)

	C	Mn	Si	S	P	Cr	Ni	Mo	A.S.T.M. Grain Size
NE 9440	0.44	1.12	0.46	0.025	0.023	0.30	0.31	0.12	6-8
NE-94T40 (Grainal)	0.44	1.05	0.50	0.025	0.021	0.30	0.31	0.14	6-7

Temper, Deg. F.	Type	Yield point	Tensile strength	Elonga- tion	R.A.	B.H.N.	Izod	"P" Value*
800	NE 9440	176,900	197,900	12.0	48.1	396	16.8	97
	NE 94T40	188,300	198,050	13.0	53.8	402	27.5	104
900	NE 9440	159,350	172,700	14.0	51.6	361	40.8	97
	NE 94T40	163,500	171,700	15.3	56.6	359	49.3	102
1000	NE 9440	141,600	154,100	16.5	55.2	321	56.5	97
	NE 94T40	142,700	152,700	16.8	57.5	321	62.8	99.5
1100	NE 9440	125,100	139,000	19.0	58.3	293	77.3	98
	NE 94T40	126,700	138,700	19.0	59.7	291	79.6	99
1200	NE 9440	110,300	121,000	22.3	63.3	256	92.5	100
	NE 94T40	111,200	120,000	22.0	64.0	255	96.6	99
1300	NE 9440	96,000	107,500	25	65.0	227	96.8	99.5
	NE 94T40	96,450	105,200	25.8	66.1	221	98.2	100.5

* The "P" value is calculated from the formula: $P = \frac{TS + 6000RA}{5000}$ and serves as a toughness-strength factor.

TABLE IV

Charpy Values at Low Temperatures for NE 9440 and NE 94T40 (Grainal-Treated) Steels (Initially normalized as 1 in. rounds at 1650 deg. F. For the 450 deg. temper, the specimens were machined to 44 in. squares before oil quenching from 1500 deg. F. The other specimens as 1 in. round were oil quenched from 1525 deg. F.).

Type	Temper, Deg. F.	B.H.N.	Charpy ft. lb. at Deg. F.					
			70	0	-25	-50	-75	-90
NE 9440	450	530	9.7	9.0	8.5	7.5	7.0	7.0
NE 94T40	450	535	23.0	18.5	19.0	16.7	17.7	18.2
NE 9440	900	361	23.7	20.5	20.0	19.2	16.5	16.2
NE 94T40	900	359	25.7	26.0	26.0	24.0	23.5	20.5
NE 9440	1100	293	29.5	31.7	30.2	29.2	24.0	24.5
NE 94T40	1100	291	33.0	34.0	31.7	31.2	31.0	28.2

Deoxidation With Beryllium

IN a series of studies on the properties and metallurgical uses of beryllium, reported on in "Metallurgia Italiana," L. Losana devotes one paper to the oxidation of steel using beryllium. He compares the oxidizing ac-

tions of manganese, silicon, aluminum and beryllium, and gives the principal formulæ and data for Be in so far as they affect the separation of the oxide and the reduction of iron oxide. Deoxidation constants at different tem-

peratures are calculated and it is shown that the addition of a few per cent of Be to steel gives complete deoxidation, a much better result being obtained than with aluminum, as has been proven by experimentation.

War Finishes Dominate

THE subject of war finishes predominated in papers and discussions at the 31st annual convention of the American Electroplaters' Society in Buffalo, June 7 to 9. The main topics were de-burring, zinc plate and its treatment, silver plate, tin plate, hard chrome, organic coatings and their treatment, metal coloring, metal cleaning, and water treatment for plating solutions.

"The Plating Situation in General" was described by W. W. McCord, WPB, who a year ago predicted that about 35 per cent of the existing plating equipment would come into actual usage. This prediction was in error. Spot checks plus general knowledge lead to the belief, he said, that the figure actually now in production is certainly 60 per cent to 70 per cent of previous capacity and may be even higher. In addition the equipment makers cannot keep up with the demand for new equipment. The outstanding reason is simply that more war goods of every character have been built than seemed probable a year ago.

The present airplane is practically either plated or anodized from stem to stern. Ordnance takes the next largest block.

Of course, the metals employed are entirely different in relative quantities used. There is a great deal more silver being plated than is probably generally realized, although some of the applications are entirely new. There is a considerable amount of copper being plated, although not comparable with what was previously done. There is a small amount of nickel, practically negligible as compared to prewar days. All the cadmium that can be produced will be plated.

The great increase has come in the use of zinc, growing by leaps and bounds. There is some additional use of lead but it is not very considerable as yet. There are some new applications for indium but rhodium remains about as it was a year ago.

The decorative uses of chromium have practically disappeared, but the usage of chromium for protection against abrasion has increased greatly. Where it was formerly used to a

New and Retiring Presidents



George Wagner, new president of the American Electroplaters' Society.



Ellsworth T. Candee, who is retiring as president of the Society.

comparatively small extent, there are today a considerable number of entirely new applications. Its use seems on the upgrade.

Tin plating on finished articles has been reduced to a low figure, but tin plating to replace hot-tin dipping on sheet has received a tremendous impetus.

Incidentally, the use of preplated sheet generally is decidedly on the increase, as witness the new pennies.

For the future, the upward trend certainly cannot continue indefinitely, but no evidence of any slackening can be seen as yet, Mr. McCord said. This cannot continue forever, because there is a definite limit to raw materials. However, no prospect of the upward trend tending to level off before the end of the year is evident.

Plating for Military Use

"Application of Electroplating to Military Supplies" was discussed by Dr. William Blum, Chemist, National Bureau of Standards, who said the field for plating is governed not only

by the availability of the metals used in the coatings, but also of the base metals used in construction of the equipment. The continued scarcity of non-ferrous metals, especially nickel, copper, zinc and aluminum and their alloys, has resulted in the increased use of plain carbon steel, which must usually be protected against corrosion by plating.

Of the metals used in plated coatings, the most critical is nickel, followed in order by cadmium, tin, copper and zinc. Chromium and silver are more available, and lead is practically unrestricted. Relatively little nickel plating is now used, even on military equipment. Cadmium is still employed to the extent of its availability on fuse parts, and airplane fittings, but even for these critical uses, zinc is being increasingly substituted. The scarcity of tin has led to extensive applications of electrolytic tin plate with much thinner coatings than were customary with hot dipped tin plate.

The use of chromium coatings for

e Electroplaters' Convention

protecting steel against corrosion and abrasion has greatly increased. Silver plating has many important applications, but its relatively high price and its tendency to accelerate corrosion of any exposed steel impose definite limitations. The available data on lead coatings warrant the active studies now in progress to determine their suitability for various purposes, especially as a substitute for zinc coatings. Even though lead usually exerts no electrolytic protection to steel, it does not accelerate the corrosion of the steel, and any pores present are likely to become plugged with the products of corrosion.

Typical applications of plating are Steel Cartridge Cases, coatings of which must resist corrosion and abrasion and must not interfere with the functioning of the guns. For artillery ammunition baked organic coatings on steel are apparently satisfactory, but on small arms ammunition, plated coatings are more promising.

The equipment and supplies required to feed, clothe and house the armed forces are placed next in importance, in plating, to weapons and ammunition.

It has been found that under the severe conditions involved in the daily washing of tableware, for example, its useful life was determined more largely by its resistance to abrasion than to corrosion. Even when steel was exposed through initial porosity or by wearing through or peeling of the coatings, comparatively little rust appeared, except between the tines of the forks. Elsewhere, any rust that tended to form was likely to wear off before it became readily visible.

In tests carried on by the Quartermaster Corps the best performance was obtained with coatings consisting of 0.0002 in. of chromium directly on case-hardened steel, and 0.00002 in. of chromium over a composite coating (about 0.001 in.) of copper and nickel. Silver coatings (0.001 in.) directly on steel or over a flash of nickel, were fairly good, but showed more signs of abrasion than did the chromium. The use of multiple silver coatings applied with intermediate burnishing appeared beneficial. The chief objection to the tin coatings were their

. . . An account of papers presented on the Cronak process, on burring, on plating of military supplies and on the government's view of the plating situation is included in this, the first of three installments reporting the convention.

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tendency to tarnish. Zinc coatings proved unsuitable for this purpose, as they turned very dark, partly because of the use of strongly alkaline soaps.

On articles more subject to deformation, such as the canteen cups and mess kits ("meat cans") chromium coatings are likely to be too brittle. In addition such articles are more

likely to stay wet for long periods, whereas the tableware is usually rinsed in boiling water and air dried. Zinc plating is being used on canteen cups and mess kits because it protects the steel against corrosion. It readily darkens in service, probably because of minute amounts of impurities in the zinc. As zinc is attacked by organic acids, such foods as tomato juice, pineapple juice, and sauerkraut should not be kept in zinc coated containers for any periods longer than needed for the consumption of the foods.

Thus far no commercially feasible coatings have been obtained that will provide as good protection to surgical and dental instruments as the composite copper, nickel, chromium coatings normally applied. Fortunately, the nickel required for this industry is relatively small and has been made available.

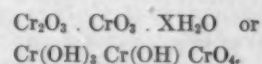
The Cronak Process and How to Use It

"THE Cronak Process" was discussed in detail by E. A. Anderson, New Jersey Zinc Co. This process, he said, may logically be broken down into three major parts: Why it is used; what it can and cannot do; how it is applied. The Cronak process, developed and patented by New Jersey Zinc Co., is a means of producing on zinc surfaces a film of chromium salts which inhibits corrosion of the zinc during subsequent contact with water.

Corrosive environments pertinent to this discussion fall into the broad fields of outdoor weathering and contact with stagnant or condensed moisture. The Cronak process was developed specifically to minimize the latter type of corrosion.

Stagnant water with limited access to oxygen, and water films which dry very slowly cause a non-uniform type of corrosion which results, in severe cases, in the formation of bulky films of white corrosion products. These films may hinder the operation of devices or otherwise be objectionable. In severe cases involving zinc coatings, early rusting of the underlying steel may occur.

Careful studies involving analytical, X-ray and electron diffraction methods lead to the conclusion that the Cronak film is a basic chromium chromate of the general formula



Analysis of a typical film reveals the following, all except the last sample having been dried at 230 deg. F.

VI	Per cent
Cr.....	8.68
III	
Cr.....	28.2
S (as sulfate).....	3.27
Zn.....	2.12
Na.....	0.32
Water (at 230 deg. F.).....	19.3

A typical film will have a weight amounting to about 0.1 gram per sq. ft. of surface. The trivalent chromium will amount to about 0.025 gram and the hexavalent chromium to about 0.008 gram per sq. ft. of surface. Thickness determinations are difficult but best indications are that a normal film will be about 0.00004 in. thick.

It is a characteristic of the Cronak



● Shown above are Maurice R. Caldwell, who was named first vice-president of the American Electroplaters' Society at its annual Convention, Clarence C. Helmle, named second vice-president, and Charles C. Conley, past president of the Society.

film that it slowly releases its hexavalent chromium to water which comes in contact with it. It is this dissolved material which inhibits the subsequent corrosion of the zinc and insures that accidentally bared zinc areas are protected.

Inspection of the data shows that the insoluble trivalent part of the film likewise contributes to the protection. The untreated specimen showed white corrosion products in one day and 89 days later had rusted. The Cronak-treated specimen showed white salts in 38 days. Had the residual film offered no protection, rusting should have developed in an additional 89 days or a total of 127 days. Actually, 998 days were required.

Over a period of years, numerous tests have been conducted on Cronak-treated specimens with the aim of learning more about the condition under which it affords or does not afford protection. Typical data have been assembled in Table I (opposite page).

Exposure to normal outdoor atmosphere where parts wet with rain, mist or dew dry relatively rapidly, involves a different situation from that encountered in the tests in Table I. Under such conditions, the Cronak film gradually loses the golden color imparted to it by the hexavalent chromium content, leaving a pale, greenish blue film which does not differ markedly in appearance from the normal outdoor corrosion film on zinc. Many such exposures have been conducted on both hot dip galvanized and electro-galvanized steel in semi-industrial and industrial atmospheres. The results of these exposures show

conclusively that the Cronak film does not extend the time to rusting by more than a few per cent. *In other words, the Cronak film cannot be considered a substitute for an adequate thickness of zinc for such purposes.*

In applying Cronak film, cleaned work or work which by virtue of its past history needs no cleaning is first wet with water (preferably at 70 deg. F.), following which it is dipped for approximately 10 sec. in the following solution:

Sodium Dichromate	200 gm.	26.6 oz.
($\text{Na}_2\text{Cr}_2\text{O}_7 \cdot \text{H}_2\text{O}$)		
Sulfuric Acid	6-9 c.c.	23-34 c.c.
(94 per cent, specific gravity 1.84)		
Water	1000 c.c.	1 gal.

The work is then removed, drained for not more than 30 sec. and rinsed thoroughly (last water should not show yellow) in cold running water. The water is then removed, preferably by means of air blasting.

It is essential that the work to be Cronak treated be physically and chemically clean. Films of grease, oil, etc., may be removed by the conventional procedures commonly used in preparing zinc for electroplating. These procedures frequently involve solvent degreasing and alkaline cleaning. Zinc plated work, which can be Cronak treated as a part of the plating cycle, apparently requires no cleaning for successful treatment. Zinc plated work which requires heat treatment to remove hydrogen, must be quenched in water to reduce the temperature and to wet the surface. It is not yet certain whether an additional step involving an acid dip to remove the oxide formed during the

heating is necessary. If such a dip is used, sulfuric acid is preferred.

It is required that all adhering treating solution be removed from the film before drying. It is impossible to accomplish this in a single tank. *The last water draining from the work must be clean and free from yellow color. This point cannot be emphasized too much.*

The adhesion of the Cronak film varies with the method used in drying. Work which is dried by hanging in still air will be found to have a chalky, easily removed film at the areas last to dry. The best system of drying is the rapid removal of visible water mechanically either by blowing it from the surface with a blast of cool air, by passage of strips, sheet and wire through soft rubber squeegee rolls or in the case of small parts, by whirling in a low velocity centrifuge. Some success has been had by drying in a tunnel or duct through which cool air passes at a velocity of 25 to 35 ft. per sec. The use of elevated temperatures must be approached with caution. Hard, adherent Cronak films will result from drying in ovens at temperatures of about 350 deg. F. *Such films will not protect zinc against the formation of white corrosion products in contact with water.*

Tanks for the Cronak process may be glass, earthenware or in large installations welded from stainless steel or low carbon steel. Rare difficulties with rapid attack on ordinary black iron have been reported. However, these are sufficiently rare to imply that, generally speaking, ordinary commercial black iron (SAE-1010) should be satisfactory during the

present war period. In normal times, it would undoubtedly be preferable to use ingot iron.

Films of unsatisfactory appearance or quality can be removed prior to retreatment, by immersion for several minutes in a boiling solution of 200 gm. of sulfate-free chromic acid per liter of water. This procedure may also be used to remove oxide films, which may have formed from chance contact with water. Should any difficulty be encountered in re-treating stripped work, passage through the alkaline cleaning cycle should eliminate the trouble.

Some loss of zinc occurs while the film is forming. Careful study under a wide variety of conditions places the range of zinc loss as 0.000003 to 0.0001

TABLE I
Typical Corrosion Test Data on Cronak-Treated Zinc

Type of Test	Time to First White Salts, Days	
	Untreated	Cronak-Treated
200 deg. F. steam saturated atmosphere.....	1	12
Vertical position in 100 deg. moisture saturated atmosphere.....	1	182
Horizontal position in 100 deg. moisture saturated atmosphere.....	1	365
Salt spray, 20 per cent NaCl, at room temperature....	8 hr.	91 to 104 hr.
Distilled water.....	1	38

in. The higher value will be reached only under the worst conditions.

This pinch roll also sets the speed of the strip while being plated. At this end, as at the entry end, a looping tower is used to accumulate slack when stripping the finished coil of steel. Both looping towers are designed to accumulate approximately 350 ft. of strip and this amount is ample for stripping coils when running at 500 ft. per min.

Current for plating is generated by six 10,000-amp., 8-volt, motor-generator sets. Anode current densities are maintained at 37 amp. per sq. ft.

Speeds up to 500 ft. per min. may be used, depending on the amount of tin deposited. For example: a speed of 350 ft. per min. will deposit a coating weight of ½ lb. per base box; a speed of 250 ft. per min. will deposit a coating weight of ¾ lb. per base box, and so on.

This process produces a silvery finish tinplate and can be further processed by reflowing the tin, which will yield a mirror-like finish. Tinplate, as plated, has a variety of uses such as bottle caps, screw caps, caps for dry pack and certain cans for wet pack. The reflowing of the tin involves the application of some form of heat to the plated strip, and this may be accomplished by high frequency induction, by electrical conduction, by an open gas flame or gas fired radiant tubes. Reflowing may be done directly in the plating line or the strip may be recoiled and finished in a separate operation.

Technique of Electrolytic Tin Plating

ELECTROLYTIC Tin Plating" was discussed by W. B. Cooper, Crown Cork and Seal Co., who pointed out that the electrodeposition of tin on steel for the production of tinplate is not a wartime product; as a matter of fact, tinplate was being produced by this method long before Pearl Harbor. By the use of electrodeposition, tinplate can be produced with one-third the coating weight formerly produced by the hot-dip method.

The sodium stannate bath was adopted because of several reasons: First, a bath was wanted that was easily controlled, one that could be operated over a wide range of conditions; second, the alkaline bath has the advantage of being non-corrosive, a desirable feature from a design standpoint. Of course, these advantages were secondary; the primary object was a surface that would solder as easily and as readily as the hot-dip plate, and a surface that would reflow readily and possess the qualities of hot-dip plate. All these qualities were obtainable with the sodium stannate bath.

All processes involving strip should be designed for continuous operation. This requires the use of two uncoilers, a welder to join the end of one coil with the beginning of another and a looping tower to accumulate slack.

The first step in any plating process is to clean and pickle the strip to be plated. This is accomplished in a continuous pickler consisting of a rubber-lined tank fitted with rubber-covered rolls and lead heating coils. In this pickling process, a weak solution of sulphuric or hydrochloric acid removes all oxides from the surface of the steel and presents a clean surface

for plating. The strip in this operation travels in a vertical serpentine manner. There are approximately 190 ft. of strip steel in the tank. After pickling, the strip is washed with clean water.

The plating takes place in one common cell consisting of a steel, unlined tank 50 ft. x 4 ft., and 12 ft. deep. Mounted on the top of the tank are 24 current-carrying steel rolls, which draw off the current from the bath. Mounted in the bottom of the tank are 24 rubber covered rolls. The strip again travels in a vertical serpentine manner, that is, under the rubber-covered rolls and over the steel current carrying rolls. Suspended between these vertical strands are 48 2000-lb. tin anodes. The plating cell contains approximately 15,000 gal. of solution and its temperature is controlled by submerged, steam heated coils.

After plating, the strip is subjected to a thorough hot water rinse to remove any adhering electrolyte, then dried by hot air.

The delivery end or the recoiling end of this plating cycle consists of a master pinch roll to pull the strip through the various preceding units.

Equipment for Solving Burring Problems

S"OLVING Burring Problems" was discussed by Frank W. Rock. While many manufacturing operations are speedily performed automatically, burring has generally slowed production and proved to be a nuisance. War production has called for the wider use of tampico (treated and untreated) and steel or other wire

brush wheels for the removal of burrs and breaking of edges on various metal parts.

In some instances the wire wheel alone will eliminate certain burrs, but where a smooth surface is required, an applied abrasive is essential which, produced in a special compound, adheres to wire ends and tampico

wheels; the wheels having wire size from 0.005 in. to 0.010 in.

The flexibility of either of these types of wheels and their power developed at high speed will permit full contact on complex parts having recessed, indented or plane surfaces, or with irregular contours, leaving a smooth ground and maintaining essential dimensions demanded for precision work or interchangeable parts.

To insure best results, as with other wheels used for buffing, the compound must be well worked into the wheel for the abrasive to develop maximum cutting action. This takes anywhere from 15 to 30 min. Run the wheel up to full speed, then shut off the power, and as it slows down, apply the compound, and after several such applications, the wheel is prepared to do the work. For burr removal only a fairly light pressure is needed, but when edges must be broken a heavier touch is required.

The surface speed of either wire or tampico wheels should be 8000 to 9000 r.p.m. for the average job, but sometimes slower speeds may be effective, depending upon the part and metal involved. Ordinarily a 12 in. diameter wheel should be used, building up sections in accordance with face desired.

On some non-ferrous metals and very small parts such as screws, studs, delicate gears, etc., an untreated tampico wheel may have sufficient force and cutting action to accomplish the work necessary.

Other ways of burring are valuable, but within their range, the use of flexible wire and tampico wheels combined with the right abrasive material is proving to be a very effective, rapid and economical method, Mr. Rock said.

"The Roto Finish," a new method of de-burring, was discussed by F. P. Green, Crown Rheostat and Supply Co. This process is comparatively recent. Even though it is in use in many plants, it is still confused by some with ball burnishing, but outside of the rotating barrel, common to both, the action and results are decidedly different. Ball burnishing, by means of hardened steel balls, does not remove metal, it merely peens down and rolls out some high rough spots without removing them, adding something in the way of brightness. Roto de-burring grinds off the burred edges and leaves a smooth uniform radius; metal is removed.

Hand-burring, at best, is not too satisfactory; a tool will slip, pressure will vary and no two operators do exactly the same job on the same piece. These are just a few of the factors which make hand de-burring

inherently non-uniform and a headache.

The Roto process may be used wet or dry, or both, in combination. The dry process is practically noiseless and the parts come out clean and dry. The equipment used consists of two motor-driven hardwood cylinders mounted on a common frame. The material used is fibrous wood, abrasive-impregnated compound and Roto-burnishing chips. The material is loaded into the cylinder and then the work (the quantity of which varies according to metal size, shape and weight) is run until the proper amount of grinding has produced the required finish. Parts are then separated from materials by means of a vibrating separator. This dry process is used extensively where parts are very delicate or require a mild polishing, buffing action.

The average time on steel parts ranges from 8 to 24 hr. and on aluminum and brass parts, from 2 to 18 hr. However, each job should be charted according to the condition of part, the type of metal and the finish required.

The wet process is more severe in its grinding action and does the de-burring or grinding more rapidly than the dry method. One to 6 hr. is the average time for steel parts and 15 min. to 2 hr. for brass and aluminum. There are three distinct divisions of the wet process: Grinding, honing, and coloring. These are used singly or in combination with each other, depending upon condition of the part, the type of metal and the ultimate finish required.

The materials used are Roto chips, fractured limestone or granite stones that have been processed. Chips are in graded sizes, 5/16 in. to 1 1/4 in., and the Roto compound (abrasive) is in paste form. The primary purpose of this compound is to keep alive the abrasive quality of the face of the chips; otherwise they tend to surface-glaze and lose their cutting and grinding quality.

The equipment consists of a watertight steel cylinder, wood lined, and is usually divided into two or more compartments. The cylinder is loaded approximately 40 per cent full of chips, then the correct quantity of work added, together with 8 to 12 lb. of abrasive compound. The mass of chips is covered and worked with approximately 4 in. of water and allowed to run for sufficient time to produce the required finish.

The terms "grinding," "honing," "coloring" approximate the familiar polishing, cutting down and color buffing operations.

Wet grinding or de-burring is at this time, by all odds, the major operation. Small parts are handled en-masse. Steel parts of 50 lb. to 175 lb. are loaded into each 20 in. x 32 in. compartment of a standard No. 2 machine.

Very frail parts can be de-burred as well as accurately machined parts, without distortion or damage to surfaces. Obviously, corners, outside edges and surfaces receive the most grinding action. Edges and corners can be ground to an appreciable radius with negligible effect on surface dimensions. Radii obtained on the edges by this method have proved more nearly uniform than edges burred by hand.

External threads of high specification, generally speaking, should be masked. The action on internal threads is very mild, and unless the opening diameter is 1 1/2 in. or larger they seldom need any shielding.

Larger parts, that are of such weight and shape that they would nick each other in spite of the cushioning of the chips, are often placed one piece in one compartment and de-burred. Obviously a piece to be thus run must call for considerable hand burring to justify running it in a separate compartment. In one instance, a five-compartment machine processed five pieces, a single piece in each compartment, in 1 1/2 hr. One operator took care of three machines. The hand burring time was 1 1/2 hr. per piece and the job was not uniform.

An interesting example of actual average plant operations where tumble de-burring replaced hand de-burring was given. Trigger guards are de-burred using the wet grinding operation only, 120 of them in each compartment, 240 per machine load in 1 1/2 hr., and one man operates three machines, thus turning out a total of 720 pieces in 1 1/2 hr. It required 20 min. each by hand or 240 man-hours to equal the output of three machines and the one operator.

The process is not a cure-all, Mr. Green said, but if parts lend themselves to this type of de-burring, or finishing, it is in nearly every case a very rapid and economical method for doing a job that is so difficult and costly by various hand methods.

"Burring by Flexible Polishing with Greaseless Compounds" was outlined by Dr. H. L. Kellner, Lea Mfg. Co., Waterbury, Conn. Other than tumbling barrels or brushes, the most important mechanical tool for burring is polishing wheel or bob, he pointed out. Polishing is the ideal method

(CONTINUED ON PAGE 128)

NEW EQUIPMENT—

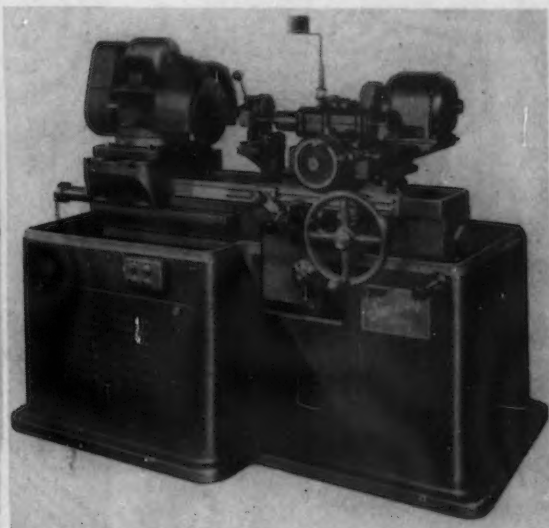
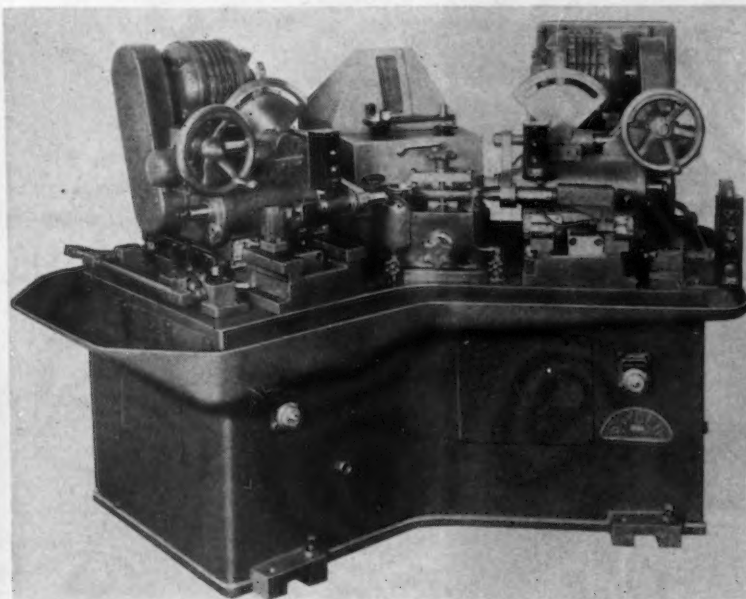
Machine Tools

... Continuation from last week's issue of description of some of the many design improvements and construction advances in metal-cutting machines, including drilling machines, lathes, planers, honers, millers and marking machines.

THE Snyder Tool & Engineering Co., Detroit, has introduced a semi-automatic machine for weighing and balance-milling connecting rods for internal combustion engines, which features the use of lights to indicate accuracy in locating excess weight. The workpiece is first weighed and the amount of excess stock to be removed is indicated on a double dial shadowgraph scale. After the piece is clamped in the fix-

ture manually, the operator advances a finder by means of a handwheel, which locates the excess metal and flashes on a green tell-tale light. This operation automatically brings the cutting tool into perfect alignment with the tip of the finder. If the wheel is turned too far, even as little as 0.002 in., a red light flashes on and stays on until the wheel is reversed to bring the tool back into perfect alignment. The pointer on the fan-shaped dial above the milling unit is set at the amount of excess stock indicated by the scale, and this sets the cutter in position to remove that amount. When these settings are

made for each end of the connecting rod, an electric push button is pressed and both units feed cutters past the work, removing the excess stock and bringing the rod to correct balance weight. Although the machine illustrated is designed for handling one connecting rod, two or more rods of various lengths and weights can be balance-milled by provision of suitable adjusters on the double dial shadowgraph scale and fixture. reciprocation by power is obtainable for long holes and automatic cycles. Automatic cross feed is also obtainable. These tables speeds range up to 55 ft. per min. Minimum table stroke is $\frac{3}{8}$ in.; maximum 24 in. Base is of welded steel construction, but the sub-bed is of cast iron, insulated from floor vibration by Neoprene pads. Spindle is carried on pre-loaded, angular contact ball bearings and carries a minimum of lock nuts. Each spindle is dynamically balanced by means of a cathode ray oscillograph.



ture manually, the operator advances a finder by means of a handwheel, which locates the excess metal and flashes on a green tell-tale light. This operation automatically brings the cutting tool into perfect alignment with the tip of the finder. If the wheel is turned too far, even as little as 0.002 in., a red light flashes on and stays on until the wheel is reversed to bring the tool back into perfect alignment. The pointer on the fan-shaped dial above the milling unit is set at the amount of excess stock indicated by the scale, and this sets the cutter in position to remove that amount. When these settings are

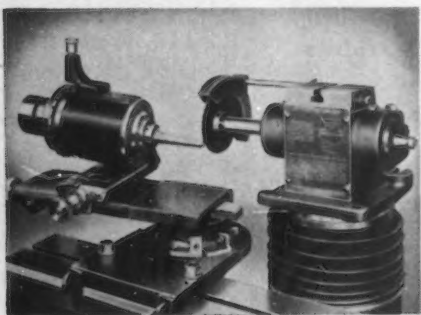
Internal Grinder

A NEW internal grinder, designed to meet varied grinding conditions, has been announced by Savway Industries, 4867 E. Eight Mile Road, Detroit. Its special feature is that it has both hand and hydraulic table feeds. Each of these is wholly independent of the other, though it is possible to use both hand and hydraulic feed in combination on the same job. Hand operation is said to give the worker complete control for setting up and to be preferable for short holes, blind holes and for face grinding. With the hydraulic system, table

Cutter Grinding Attachment

A No. 1 size grinding attachment, recently announced by The Cincinnati Milling Machine Co., Cincinnati, for use on its No. 2 cutter and tool grinder, facilitates the grinding of ball-end cutters up to 3 in. diameter and die sinking cutters. With the addition of accessory equipment, other types of work may also be handled, such as double-end cutters (straight or helical flutes) and cylindrical grinding of die-sinking tracer fingers. Two slides have longitudinal and transverse adjustment of the work with respect to the grinding

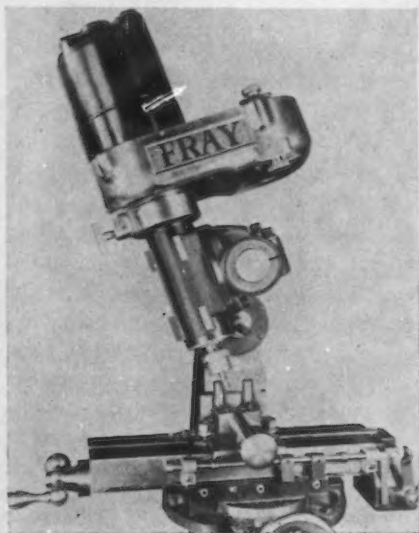
wheel. A large diameter and anti-friction pivot in the base is arranged so that the slides may be swiveled as a unit through 360 deg. Swivel motion is controlled by movable stops. An index plate at the rear of the workhead spindle has 24 notches for



use in indexing which will handle straight flute cutters without the necessity of a tooth rest. Accessory equipment includes a motor for grinding cylindrical parts such as tracer fingers; also collets and sleeves for grinding straight shank and taper shank cutters. A unique stop collar enables the operator to quickly remove small cutters for inspection and return them to the same position they were in before.

Vertical Milling Attachment

A NEW vertical milling attachment, known as Type F, offered by the *Fray Machine Tool Co., Inc.*, Glendale, Cal., will handle up to 1/2 in. end mills in tool steel and is for use on both bench and floor model milling machines. The new attachment has a quick ejection collet, with hardened spindle nut. Motor bearings are of lifetime lubrication type, and there is only one lubrication point on the entire machine. A 1/2-hp. Frayco



motor is furnished in either 1750 or 3500 r.p.m. as required. Spindle speeds for the 1750 r.p.m. motor are 435, 650, 1170 and 3500 r.p.m. A four-sheave idler pulley shaft is supported in the bronze yoke by radial thrust bearings and both yoke and belt are protected by an aluminum guard. Housing and overarm adapters are of Meehanite gray iron castings which are normalized. Angular adjustment is ± 30 deg. in one plane and 360 deg. about the overarm. Overarm adapters are available in various sizes to fit standard overarms.

Honing Machine

TWO models of vertical honing machines have been announced by *Micromatic Hone Corp.*, Detroit, one of which has capacity from 1/4 to 1/2 in. diameter work and the other from 3/8 to 2 in. diameter work. Both models accommodate work up to 12 in. long and have a maximum working

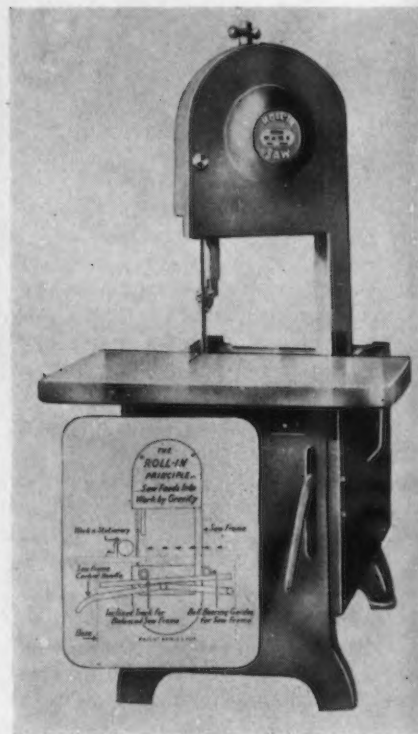


stroke of 15 in. A belt-driven spline actuates the spindle, which is arranged with integral, mechanically actuated reciprocation of the tool. The entire spindle head is also reciprocated on hardened bars under hydraulic control with adjustable speed. Standard manual adjustment is provided for the spindle head and also an adjustment of lift-out stroke above the operating stroke. Additional hydraulic controls, provided in the hy-

draulic control panel, include automatic timer for cycle of spindle head movement, manual visual control of tool approach to the work, dwell control for spindle head stroke and emergency stop for spindle head movement. These machines are regularly furnished with riser block tables and have ventilated columns. Optional extra equipment includes three speed-changes for spindle rotation; swinging table, mounted on hardened bars fastened to the machine column; coolant filter built into base and coolant refrigerating unit.

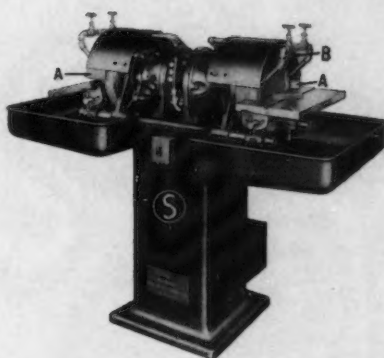
Metal Cutting Bandsaw

A VERTICAL metal cutting bandsaw which feeds the saw into the work by gravity pressure is being produced by *Universal Vise & Tool Co.*, Parma, Mich. Saw blade feeds into work through movement of balanced blade wheel frame on inclined track. Blade pressure is automatically regulated by texture and degree of hardness of metal being cut, which eliminates blade breakage due to incorrect pressure. The saw is adaptable for cut off, trim and contour work. A 1/2-hp., 110 v., 60 cycle, a.c. sleeve bearing motor, 1725 r.p.m., drives the saw at 81, 161, or 264 ft. per min. Saw cut is vertical and down with maximum cut 7 in. vertically. By resetting work, any length cut can be made. A swivel block for holding work can be removed for contour jobs or long straight cuts.

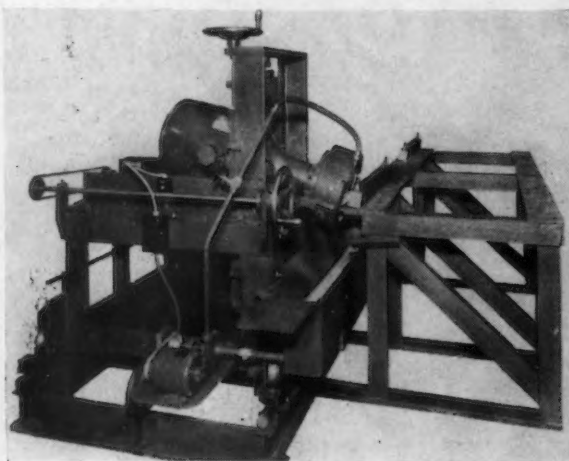


Armor Plate Grinder

THE Vonnegut GRC type grinder, made by *Vonnegut Moulder Corp.*, 1819 Madison Avenue, Indianapolis, is available with a 10-in. diameter segmental abrasive wheel driven by a 7½-hp. motor or a 14-in. wheel driven by a 10-hp. motor. The grinding unit has an adjustment of 45 deg. below and above horizontal, with adequate vertical and horizontal adjustment to compensate for angular setting. Frame of grinding unit is supported upon four grooved wheels which roll upon a pair of round steel



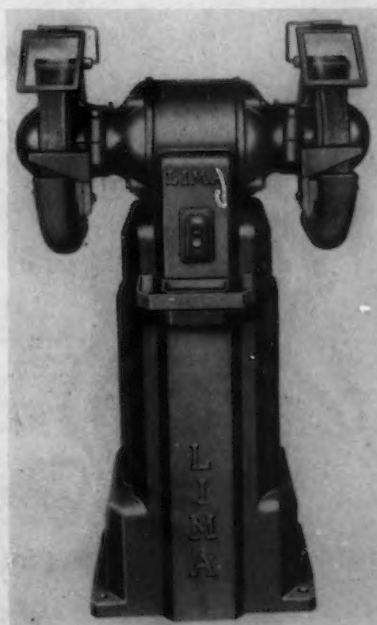
and 30-deg. angle away from it. Each wheel is protected by an adjustable shoe A on the splash guard, manipulated by handscrew B. The construction of the machine permits optional use for either dry or wet grinding, the wet grinding attachment being powered by individual motor drive, separately controlled. The grinder is also made in 1-hp. 10-in. and 2-hp. 12-in. sizes.



tracks mounted on a pair of I-beams. The grinding unit is drawn back and forth along the track by a power feed reversing cable driven by a ½-hp. motor. A coolant tank and motor-driven pump travel with the grinding unit. Maximum efficiency is developed with table a bit longer than twice the length of the work so that a finished piece can be removed and replaced at one end of the machine while another is being ground at the other end. The cable drive of the grinding unit lends itself to changes in dimensional specifications. The machine was designed for grinding straight-line, square and beveled ends and edges of certain hardened armor plate patterns.

Carbide Tool Grinder

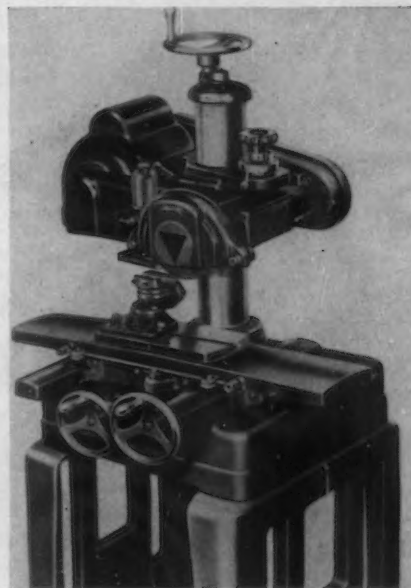
THE STANDARD ELECTRICAL TOOL CO., 2488 River Road, Cincinnati, has redesigned its 3-hp. 14-in. carbide tool grinder to incorporate the latest features in substantial construction. The machine is operated by magnetic reversing starter and separate push button station. Spindle ends are equipped with steel backing plates for mounting of cup type grinding wheels. The graduated table, rigidly mounted, permits a 5-deg. adjustment toward the wheel



distance of 20¼ in. between the wheels, while Model 25S has a 24-in. distance. The motor is totally enclosed, and push button control with overload protection, heavy-duty ball bearings, adjustable tool rest and combination lift-out water pot and tool tray are provided.

Chip Breaker Grinder

A LOW cost chip breaker grinder for carbide tools has been introduced by the *Delta Mfg. Co.*, Milwaukee. It can also be used for grinding form tools and thread chasers or as a surface grinder. One of its outstanding features is the "Univise," which holds tools up to 1½ in. square at any desired angle. The vise is built of four component parts, each with a separate circular scale of 360 deg. and four distinct planes of



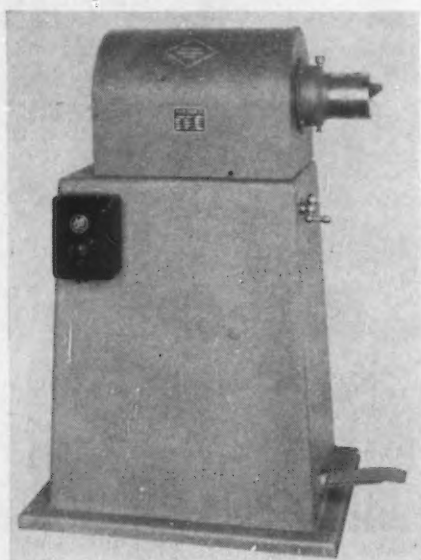
adjustment. A wheel adapter is used so that once a wheel has been trued up, it can be removed and replaced without any further dressing. The forward spindle bearing is a large surface taper bronze bearing which runs in a continuous bath of oil. The rear bearing is a sealed ball bearing. Grinding head is carried on a round column about which it may be adjusted 360 deg. Rapid vertical adjustment of the wheel to the work is effected by means of a handwheel at the top of the column. When close to the work, final fine adjustment is made by a micrometer screw. The smoothly operating table, with conveniently located control handles, has long ways so that it is always riding solidly. A pump attachment provides coolant for resinoid bonded diamond wheels.

Pedestal Grinder

THE Lima tool room pedestal grinder, offered by the *Lima Electric Motor Co.*, Lima, Ohio, is designed as a 2 or 3-hp. unit, 1800 r.p.m., 2 or 3 phase, a.c., 220, 440 or 550 volts. On both models the wheel size is 12 x 2 in. and the wheel arbor diameter is 1¼ in., the height to the arbor being 39 in. Model 24S has a

Speed Lathe for Lapping

PRECISE lapping and finishing of metal or plastic parts is accomplished by the VA3B-C "Ideal" variable speed lathe with a range of 100 to 4800 r.p.m. which is manufactured by the *Schauer Machine Co.*, Reading Road, Cincinnati. It is said to be essentially effective on final finishing operations of heavier work that requires burring, filing, polishing and lapping of gages, gears, pinions and pulleys. The variable speed of the VA3B-C is obtained through a Reeves drive. An improved Twin-Disc clutch assembly transmits the power from a continuously running motor to the spindle of the lathe when the foot treadle is depressed. Release of the treadle automatically applies a brake. Selection of the variable speeds is obtained by the ballcrank handle on the side of the machine. Variable speed ratio is 6 to 1 for one speed motor

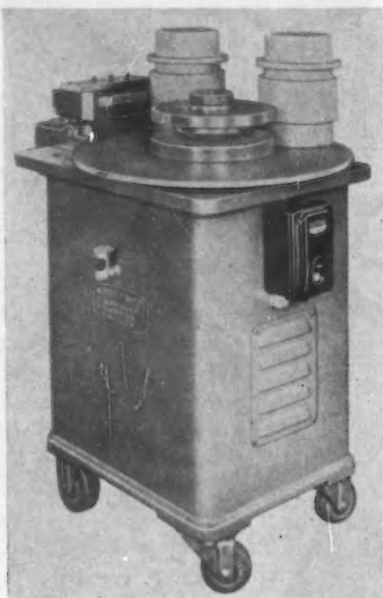


and 12 to 1 for two speed motor. The spindle and holding devices are contained in a separate welded steel housing which is mounted on a welded steel floor type pedestal. Chucks of conventional type and special holding fixtures are available. Chuck end of spindle can be provided with a taper hole or a removable taper socket.

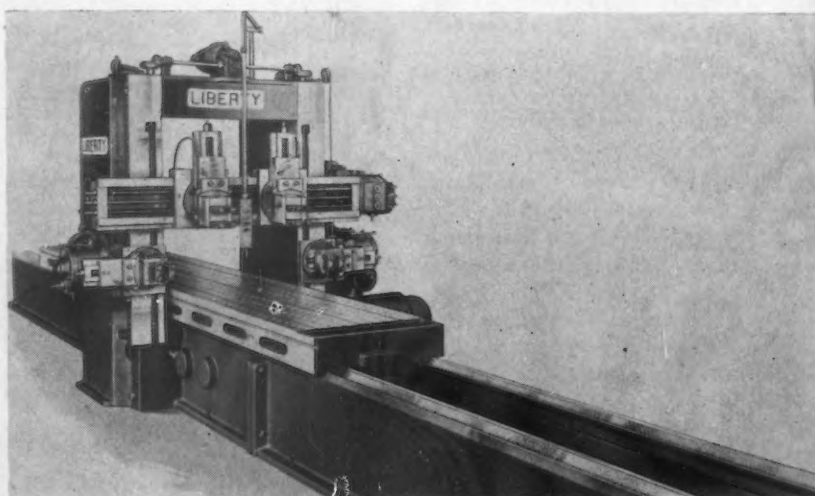
Marking Machine

A HIGH speed precision marking machine, Model No. 13, suitable for permanently marking identification data into the periphery of aircraft engine cylinder barrels, has been placed on the market by the *Noble & Westbrook Mfg. Co.*, Westbrook Street, East Hartford, Conn. It can also be used for marking any cylindrical object having a thickness

sufficient to withstand the marking pressure. The cylinder barrel or part to be marked is placed on the continu-



ously revolving dial, and carried between the pressure dial and marking die. The mark is impressed into the metal, and the piece continues around to the unloading point. Either solid marking dies or interchangeable steel type can be set up in the die holder. The dial of the machine is adjustable up and down, and the die holder has some vertical adjustment so that the mark can be made on the piece close to or 3 or 4 in. from the end. Pressure on the die holder can be adjusted for different hardnesses of material, the size of the characters on the marking die, or required depth of impression. The carrier dial runs at a slow speed for easy feeding, while the pressure dial is speeded up to give a minimum of marking time. Machine is mounted on casters so that it can be moved to the work piece.



Medium Duty Planer

LIBERTY PLANERS, Hamilton, Ohio, has put on the market a new 48 x 48-in. double housing medium duty planer. Bed is of box type construction with cross walls well ribbed and with bottom mounting flanges. Bed Vs are pressure lubricated. Housings are extra heavy box type bolted and doweled to bed, and a deep heavily ribbed cross brace is provided on top of housing. Face of housings are extra wide, providing large bearing surfaces for cross rail, which is individually motorized for elevating. The two rail heads have four-way power feed control with micrometer adjustment to both vertical and horizontal feeds. Power rapid traverse is available for the full length of cross rail. Clapper boxes have wedge type clamping devices and pneumatic tool lifters. Planer comes equipped with two counterbalanced side heads. Individual motor, power feed and rapid traversing mechanism are mounted integrally with each head. Power feed and power rapid traversing up and down is provided. The infeed of the side head tool is operated manually. Rail heads and side heads are equipped with electrically operated friction feeds.

Table drive gearing is composed of semi-steel secondary gearing and a steel high-speed herringbone primary drive. Automatic table operation is through inching type pendant switch. Electrically operated limit and slow down switches permit the machining of deep shoulders and blind pockets. Drive is by a 30-hp. d.c. variable voltage reversing motor supplied by a motor-generator set. A range of table speeds from approximately 5 to 150 r.p.m. is provided.



They're setting 'em up for Smiling Billy, tonight!

SURE and there are those who'd punch the nose of the man who wouldn't lift one to Billy, tonight — in a dignified fight, of course.

For we've turned back the timeclock to March 7, 1903, when Smiling Billy had a hand in the destiny of a great American industry. . . . He fought a battle with a giant turbine, while history hung in the balance.

He was a shop foreman in one of the early plants of General Electric. His company had pioneered research in turbine engineering, and had staked its reputation on the plans of the first commercial steam turbine generator. It was to be a gigantic machine, and the Commonwealth Edison Company of Chicago had courageously designed their entire new Fiske Street generating station around the plans for this unborn behemoth. . . . The date they had set for the official test was March 7, 1903.

By February, the turbine was still months from completion. A meeting of foremen was called. "Who among our general foremen is 100 per cent qualified to complete the building of

the turbine *on time*?" they were asked. A single name had the vote of every man there.

The story of Billy's battle with the turbine is a minor classic of one man's knowledge of machinery, tools and men. Around him lay thousands of unfinished parts. Ahead of him lay the task of assembling a machine as big as a two-story house and as delicate as a lady's watch — that could shatter itself to pieces from a microscopic error in tolerance.

He won. On March 7, less than three weeks from taking over, Smiling Billy waved a grimy hand, and the first big turbine generator began to whine a brand new song of power.

History is made that way. It's being made that way today, in the biggest battle of all time, because many of the great men of industry are men with grease on their hands.

Today, Jones & Lamson machine tool engineers are working with those men on hundreds of America's most important assembly line jobs — and have been from the very beginning of every great industry in America. They were there in the days of Smiling Billy, and they'll be there tomorrow when you call!



JONES & LAMSON

Universal Turret Lathes . Fay Automatic Lathes . Automatic Thread Grinders . Optical Comparators . Automatic Opening Die Heads

MACHINE CO., SPRINGFIELD, VERMONT, U.S.A.

Profit-producing Machine Tools

Assembly Line . . . STANLEY H. BRAMS

• Race riots impair Detroit production, casting shadows over period ahead . . . Output of automotive industry sets record in May . . . Truck needs are analyzed.



DETROIT—Because last week's race rioting bore directly on production then, and will in the future, it justified discussion here.

Factory output was affected noticeably Monday of last week, when the riots bloomed to fullest flower, and even more Tuesday, when Negroes feared going to work. Wednesday saw operation levels improving, and by Friday production was close to normal. But the scars were not healed, nor will they be for a long time.

The Rouge plant was severely impaired Tuesday, its colored absentee rate running upwards of a third of total Negro employment. Output can be estimated to have declined 20 or 25 per cent for the Rouge as a whole. Monday's production showing was only slightly better.

Other plants closer to the scenes of the rioting reported that Negro absences on Monday ranged from 50 to 90 per cent, and white absences ran up to 25 per cent. Tuesday absenteeism was close to 100 per cent among Negroes in many factories, and continued high among white workers.

It can be estimated that for the Detroit area at large, an average of a quarter or a third of a day's production was lost by every plant in the metropolis, for widespread absences result in an even greater proportion of output loss.

This was more damage than a fleet of German bombers could have done in an average-size raid.

A chance fist fight started the riot-

ing, shortly before midnight Sunday night. Rumors fed it—rumors among Negroes that a colored woman and her child had been thrown into the Detroit River and drowned, rumors among whites that there was a Negro uprising in progress. Telephone lines handled an all-time record number of calls Monday as these lies were fed from lip to lip, with Axis mouths probably helping most assiduously to spread them.

Monday was the day the rioting should have been stopped cold. Negro mobs trampled through Paradise Valley, Detroit's Harlem, smashing and looting white-owned stores. White mobs roamed the edges of Paradise Valley, falling on stray Negroes and Negro-driven cars, administering merciless beatings.

WHILE this was going on the mayor of Detroit issued one of the most pitifully inept statements that ever came from an American public official. The sum total of the statement was that people shouldn't riot, that it was actually unpatriotic. This while 30 men and women, white and black, were being clubbed, shot and knifed to death in the streets.

The attitude of the police department accurately mirrored this trembly-kneed statement. Fearing the loss of the colored vote or the white vote or any other vote, the mayor did not or would not give the order to police to break the rioting by the one means a mob understands—nightsticks, and revolvers if needs be. Instead, police were matched against rioters in the general proportion of one squad car of men against 500 or more inflamed hoodlums. The inevitable result was that the law, made feeble by dispersal, had to stand aside and watch murder committed before its eyes.

At any time during Monday a show of force and determination might have broken the riot's back. Finally, the police began to alter their tactics, but hardly in a way to end the rioting; they began to shoot up stragglers of the mobs, and the looters of the stores. It took the incoming troops to disperse the mobs themselves, and they did it without firing a shot—a glittering contrast to the curious paralysis with which Detroit's administration and police department showed itself endowed in its hour of crisis.

Many hundred rioters have received 90-day misdemeanor sentences. Many

thousands of others are home free—low-end Negroes and ignorant "poor white trash" which came north from the hill country in recent years, together with good representation from Detroit's squalor stratum and dead-end youth. These have learned no lesson yet, and the city wonders what they will do with the troops gone when the next temper flares up.

Meanwhile, Negro factory workers—there are 50,000 or more of them in Detroit, nearly 10 per cent of the total payroll—go to their jobs worried and disillusioned, likely reactors to Japanese "color war" bait. Their attitude today is typified by the Negro office cleaning woman who posed this question to her employer: "My brother's in a training camp down south, in the Army. But what's he fighting for when things like this go on at home? What's he fighting for?"

SUCH are the effects. The broad causes are deep-seated. Much measured Detroit opinion, developed without prejudice, is that the Negro race may have advanced too rapidly in the social scale in recent years, that the ability of too many Negroes, as individuals, to keep pace with the progress of their race was severely and quite logically strained. In this viewpoint, quite obviously, is inherent criticism of Administration policies, but it comes not only from quarters which oppose the New Deal, but from others which have been neutral or in support of Mr. Roosevelt's policies. At any rate, the increased opportunities afforded Negroes, the higher pay rates, and the march towards actual equality with the whites are held responsible in such chains of reasoning for Negro attitudes which rubbed raw the feelings of whites whose social viewpoint favors the club and the gun, rather than the amenities of a more thoroughly veneered civilization. In this viewpoint may lie the underlying causes of a shoddy and disgraceful flaunting of law and order in which both sides, black and white, precipitated the actual starting incidents.

Race tension at Detroit, Beaumont and other cities plays a part, significant though small, in the national war production effort. But the automotive community was rather surprised at the statement of Undersecretary of War Robert P. Patterson that arm output had fallen 3.5 per cent in May from April, even though similar state-



PROMISE

PERFORMED...



We have raised our sights this year, and are turning out the planes and the tanks, the trucks and the guns we need. And here's the machine that on a thousand production lines is turning estimates into performance . . . the Bullard V.T.L.

For over 40 years the special function of the Bullard Vertical Turret Lathe has been to save time. It has two independent cutting heads. Constant operation saves the time between cuts. Rigidity is engineered into every part—to guarantee sustained accuracy. We're working day and night to produce more and more V.T.L.s . . . for every one we can put in your shop means greater assurance of vital production for victory.



Photos (top) U. S. Army Air Corps; (others) U. S. Army Signal Corps.

THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

ments had previously been made privately.

The Automotive Council for War Production reported that May deliveries from member plants totaled \$685,000,000, compared with April deliveries of \$670,000,000. This advance, it was pointed out, came in the face of continued renegotiation agreements whose effect is to drop the dollar volume gain on delivered goods below the actual proportion of increased deliveries.

Employment in the industry has increased to 1,221,000 salaried and

times the population found within their boundaries.

In preparation of data on truck use in wartime, the statistical department of the Automotive Council found that 30 per cent of the non-farm population in New Mexico, 27 per cent of that in Maine, and 24 per cent of that in Vermont are located in communities not served by rail. There are 15 states where 10 per cent or more of their non-farm populations live in railless communities.

The answers to questions put forward in the surveys provide an inter-

will be used in heavy industry; only a few of them will funnel into over-the-road service. The presentation of briefs such as the one on communities served only by trucks quite conceivably could be a prelude to apparently well justified efforts on the part of truck manufacturers to produce during forthcoming months not only heavy trucks such as have been authorized, but lighter units as well. This likelihood appears particularly strong against the fact that the heaviest share of the military truck program is over the hill, leaving spare facilities in the truck plants for the manufacture of civilian trucks.

This is a very different thing, incidentally, from the manufacture of passenger cars. In the first place, facilities exist to produce trucks, but there are few for passenger cars. In the second place, the supply of trucks appears definitely at low level; despite shrinkage of about 3,000,000 passenger cars on the road, there is still an adequate nationwide supply, measured by any standard, in the remaining 25,000,000 or so.

Registrations as of May 1, compiled by the National Automobile Dealers Association, showed a decline in a cross section of states tallied, at a rate of 10.4 per cent a year.

The reduction, interestingly enough, was about in line with the number of cars junked in recent normal years, but of course in the past, this loss has been taken up by new car sales.

Texas and Utah are the only two states with more passenger cars in service on May 1, 1943, than on May 1, 1942, but the gain was small in each case. Pennsylvania's loss was 262,078, and Illinois fell 283,684.

The number of trucks in service May 1, was lowered 3.8 per cent during the 12 preceding months. This reduction is in the face of an intensified use of trucks as shipping mediums, probably the heaviest load which has been placed on commercial vehicles in American history.

Resistance Welder Makers Publish Technical Manual

• • • Intended to serve as a practical reference book for metal fabricators, the "Resistance Welding Manual" brings under one cover all pertinent data on the subject. It is published by the Resistance Welder Manufacturers' Association, 505 Arch Street, Philadelphia, and contains all of the resistance welding material originally incorporated in the 1942 edition of the "Welding Handbook," published by the American Welding Society.

PLANNING AXIS HEADACHES: Pictured are the four men who direct warplane output for Curtiss-Wright Corp.'s Airplane Division. Left to right are: G. J. Brandewiede, manager, Kentucky plant; William Davey, manager, Buffalo plants; J. P. Davey, manager, Columbus, Ohio plant; and C. W. France, manager, Missouri plant.



hourly-rated workers, the Auto Council said, employed in 825 vehicle, body and parts plants. More than 85 per cent of these are hourly rated; more than 318,000 or 26 per cent, are women.

With May output equal to an annual volume rate of \$8,220,000,000, the automobile industry is well along toward the ten to twelve billion dollar annual rates figured as its practical capacity. But advances from here on may be difficult to achieve.

THE truck is an essential in modern American civilization, but it still comes as somewhat of a surprise to find that the number of communities which are entirely dependent on motor transportation for goods shipped and received now total 54,000 or 40 per cent of all communities in the United States. With a population of nearly 8,000,000, these communities represent over 6 per cent of the nation's total non-farm population, and because they are predominantly in rural areas, they serve many

esting cross section of today's transport conditions. The principal difficulty experienced in 270 areas which replied to the questions was said to be lack of adequate supplies of repair parts for vehicles. Nineteen per cent of the replies mentioned this shortage as a serious problem and many stated there were no adequate facilities to perform repair work. Thirteen per cent of the communities reporting classed as serious their lack of vehicles. Out of 270, a total of 104, or 38.5 per cent, reported transportation difficulties of one sort or another.

In the aggregate, other difficulties cited were shortages of mechanics and repair shops or both, shortages of drivers, shortages of tires, and miscellaneous wartime restrictions.

Findings like these serve to emphasize the need for adequate truck transportation. The War Production Board has already recognized this need with allocations for the manufacture of 7350 trucks for civilian use during the last half of this year. For the most part, however, these units

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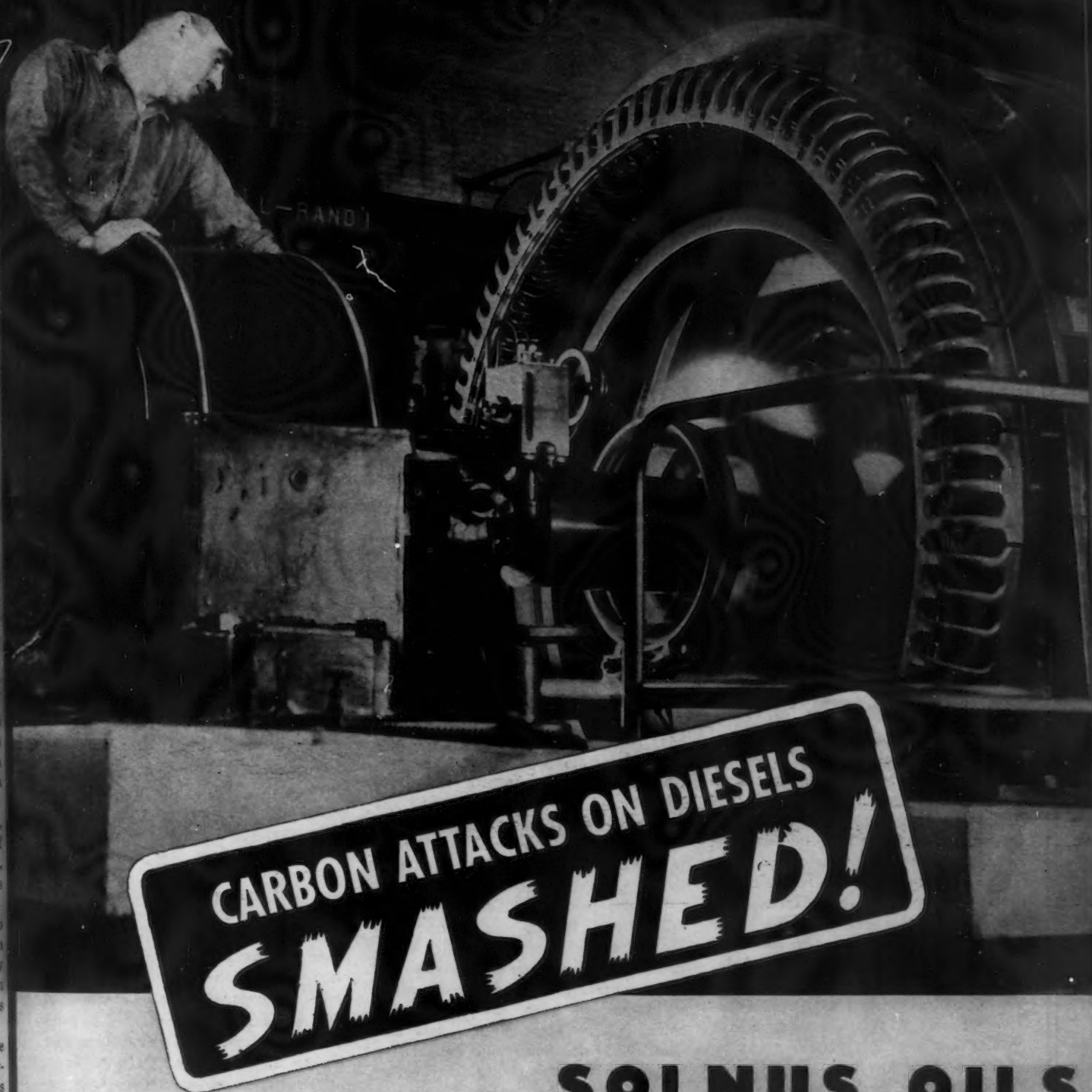
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**CARBON ATTACKS ON DIESELS
SMASHED!**

SOLNUS OILS

"Solve carbon problem . . . eliminate fire hazard"

For 10 years the generator-connected diesels in a large plant manufacturing electrical controls were plagued with carbon. Numerous high-grade lubricants were tried—all resulting in the same trouble. Carbon accumulated to such a point that forced shutdowns occurred on an average of once every 60 to 90 days, causing serious trouble and power losses.

Then a Sun Oil Engineer—a diesel lubrication expert—recommended Solnus Oils. They solved the carbon problem . . . stopped numerous shutdowns and fire hazards . . . ended costly power interruptions.

Solnus Oils are scientifically-developed to give "top-notch" performance . . . to keep your present equipment running smoothly, trouble-free. These modern diesel oils are wholly distilled, low in carbon content, neutral in acidity, and can stand up and take it.

Call on the service of Sun Oil Engineers—those capable Doctors of Industry. Let them show you how to keep your engines at peak efficiency . . . to produce untailing power for victory production.

SUN OIL COMPANY • Philadelphia
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SUN PETROLEUM PRODUCTS

HELPING INDUSTRY

HELP AMERICA

• Brake appears to have been applied to movement to restrict brand names and trade marks . . . Business interests warned, however, that it may crop up with renewed vigor after the war.



WASHINGTON—For the duration at least there is a halting belief that the movement in government agencies further to restrict brand names and trade marks has been checked. This development is traced directly to vigorous protests by business interests before the House Committee to Investigate Restrictions on Brand Names and Newsprint. The committee is headed by Representative Lyle H. Boren, Democrat of Oklahoma, and was set up under a House resolution introduced by Representative Charles R. Halleck, Republican of Indiana.

While there has been no objection to reasonable grade labeling and standardization, the House resolution was prompted by growing concern both in Congress and in business circles that "advanced thinkers," particularly in OPA, had in mind tight and permanent Federal regimentation of all industry. This attempt was being made under the guise of the war emergency. The ostensible purpose was to stabilize prices, insure quality products and bring about their efficient distribution at low costs for the benefit of consumers. Business has protested that lower quality, increased costs and loss of good will built up by identity of advertised branded products would result.

The American standard of living, the committee was told by Dr. George Burton Hotchkiss, professor of marketing of New York University, could

never have been attained without the use of advertising, branded names and trade marks. The hearings have chiefly concerned brands and grade labeling of food and textiles but all lines of industry—steel, metal working or any other—would be affected, it is charged, if the planners were given free rein.

PRISE Administrator Prentiss M. Brown says that this apprehension on the part of business is entirely unfounded. No one who knows Mr. Brown's record will question his sincerity when he flatly denied before the committee that "individual officials in OPA are out to use price control to change the American system of free enterprise. . . . I could not tolerate such a situation for a moment. I know my staff and I know that they are interested in one job alone—effective price control."

In explaining the relation of standards to price control, Mr. Brown said that they serve two purposes: (1) to make possible uniform dollars-and-cents ceiling prices by providing a description of the article to which the price is tied; (2) to protect against deterioration in the quality of the article without corresponding reduction in price.

"Under peacetime conditions," Administrator Brown said, "the same play of competitive forces which keeps prices down and makes government price control unnecessary keeps quality standards high. Under wartime conditions of scarcity of goods and shortage of manpower our competitive system tends to operate in reverse. Instead of keeping prices down and

quality up, it raises prices and lowers quality."

With respect to certain types of goods, especially in the field of consumer goods, much of what Mr. Brown says has merit. And actually much branding and labeling has developed on this basis. This is indicated by the fact that there are 290 standard provisions in existing price regulations, of which, Mr. Brown said, no less than 159 are accepted trade categories. Of the 131 remaining standards, government agencies other than OPA established 91. Only 31 of the total 290 were developed by OPA.

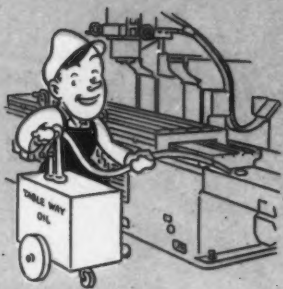
SOME of the planners have been weeded out and the movement in OPA slowed down since the advent of Mr. Brown as price administrator. This, together with the avalanche of complaints from business before the House committee, appears but by no means insures that a brake has been applied to the movement for the remainder of the war period. But it is confidently believed that the brake will be released and the movement accelerated by the government planners after the war, if they are still in position to do so. For Mr. Brown's assurance regarding knowledge of his own staff, many think, is overstated. But equally, if not more, important is the fact that powerful organized labor groups are back of the movement. Indeed they have been responsible to a major degree for starting it. They are said to be preparing to push it strongly after the war, while contenting themselves merely with keeping it stirred up during the war period sufficiently not to let the public forget about it. Spearheading organized labor's campaign is the CIO-UAW.

Organized labor has been promoting standardization and mandatory labeling on the ground that price control has not proven effectual. The cost of living, they maintain, has outpaced wage increases, a contention that certainly is not accurate with respect to many labor groups. It is insisted that costs of production and therefore of living would be lowered by grade labeling and standardization, another claim that has been strongly challenged. Nevertheless, with the present high war wages, organized labor is less interested now in grade labeling and standardization than it

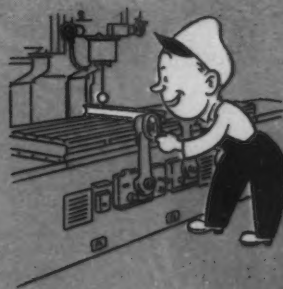
To Arms, Men! WPB Now Deflating Pride

Washington

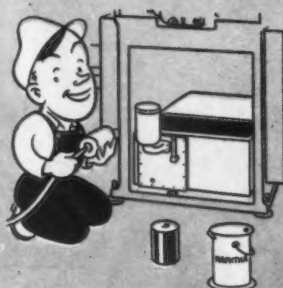
• • • Backed up by a survey by its Diamond Die Unit of Miscellaneous Minerals Division, WPB last week issued a statement that women have been found to be men's equals or betters in making diamond dies. Thus has been quashed reflections, no doubt cast by envy-inspired men, that women were inferior to men in this industry and were turning out inferior dies. It was these unkind reports that started the inquiry.



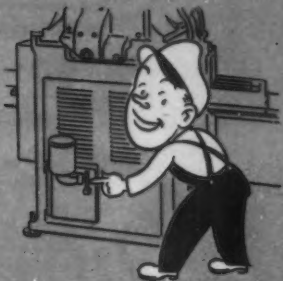
Follow lubricating instructions. Use oils of recommended specifications. A central lubricating department will do the best job.



Check the accuracy of level, both table and rear base, at about two month intervals. Accuracy begets accuracy.



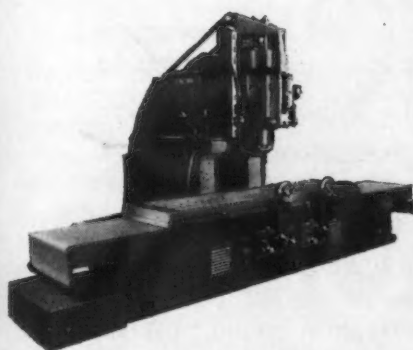
Periodically remove and clean all filters; (cloth filtering type for table way oil; metallic type for hydraulic oil; stone filters added for machines equipped with profiling unit.) Wash in naphtha or similar cleaning fluid. Use emery cloth for stone filters; blow out metallic and stone filters with air blast.



Check oil levels daily and maintain an adequate supply of clean oil in the reservoirs. "Starved" pumps can exert no more effort than starved people.

FITNESS PROGRAM

Keeps Machines Going, Too!



● **CINCINNATI 28" Series Vertical Hydro-Tel Milling Machine.** A "bear" for heavy stock removal, with a delicate "feel" for accurate die-sinking and profiling jobs. Complete description and engineering specifications may be obtained by writing for catalog M-1018-2.

● It takes more than steel, aluminum, magnesium and rubber to make fighting and defense equipment. Admittedly, many basic materials are the first requirement, but they must be cut, bent, shaped, moulded, cast and so on by machines. And a machine which is out of commission can do no work; the materials remain as inert chunks of matter.

To keep machines in first class operating condition, follow a mechanical fitness program, with dogged attention to basic and seemingly obvious details. Some of the details to keep after on CINCINNATI Vertical Hydro-Tel Milling Machines are tabulated here:

1. **Level the machine periodically.** A good rule is to check the accuracy of level every two months, of both table and ram.
2. **Follow lubricating instructions.** A lubricating schedule tag tied to the machine will serve as a convenient reminder.
3. **Use clean containers for oil,** especially for the hydraulic oil.
4. **Clean the oil filters periodically.** This is very important for hydraulic oil filters, both cartridge and stone types.
5. **When not using power feeds place feed series lever in "SLOW" position.** Eliminates wear in one spot.
6. **Always stop spindle drive motor before spindle speeds.** Save the gears.

These chores are simple and easy to do, and require little time. Make them a habit and avoid the ills fostered by neglect of large hydraulic machines... chatter of traveling units... inaccurate work... low power efficiency... uneven traverse... no response to movement of levers. Give your Hydro-Tel a break... give it a chance to make a production record equal to your attendance record.

TOOL ROOM AND MANUFACTURING MILLING MACHINES... SURFACE BROACHING MACHINES... DIE SINKING MACHINES

will be after the war. When hostilities come to an end, organized labor will seek to make the public increasingly "consumer-minded." And if the government planners are still brain waving in their ~~soft~~ government jobs they will do more than their bit.

SHARING the view of industry, WPB has taken the stand that standardization-simplification-labeling should be placed on a voluntary basis worked out through cooperation between the government and industry. The farm group, countering labor's and the planners' move, also is urging price increases and has opposed the trend that had set in for standardization-labeling, which they say would destroy necessary price rises.

Results of the House committee investigations were first seen in the amending of the OPA canned goods labeling order. It is now not necessary for labels to appear on cans. They are required only on invoices and price lists. It also looks as though OPA is weakening on the regulation requiring labeling of women's rayon hosiery. Robust protests from the trade have brought from OPA the statement that the whole matter is an experiment and "trial." That is to say "hosiery" figuratively is being

made a guinea pig. This is interpreted to mean that OPA is preparing to modify the regulation. Moreover, since the firing of Deputy Price Administrator J. Kenneth Galbraith, who wanted to appease labor unions by requiring mandatory labeling of canned goods, the battered OPA has become more conservative, and is seeking the support of business and agriculture to fortify itself against the attacks from several sources that it has been facing.

This friendly attitude of OPA toward business is attributed to both Mr. Brown and Lou Maxon, of Detroit, head of Maxon, Inc., well known advertising agency, who has feuded with and succeeded Galbraith. The bitter oratorical onslaught from Congress on OPA's policies, to say nothing of the deep House slash in its appropriations, has had a sobering effect on this much be-deviled alphabetical soup agency.

YET while the move to restrict brand names and trade marks and to establish grade labeling on a wide scale in all industries has been checked, business interests have been cautioned against the idea that the movement has been killed. Instead they have been warned that it may crop up with vigor after the war.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Bus Quotas Set

Washington

• • • A program for the production of street cars, integral buses, bus bodies, trailer buses, and sedan conversions was announced by WPB, Saturday, through the Bus and Electric Railway Section, Transportation Equipment Division. The program is complete except for final approval of certain components of integral buses.

The approximate quantities approved for 1944 production are:

Street Cars of PCC type, 300.
Integral Buses, 7300.
Bus Bodies, 11,000.
Trailer Buses, large, 400.
Trailer Buses, small 1200.
Sedan Conversions, 3200.

Iron Ore Head Quits Steel Division Position

Washington

• • • Samuel O. Hobart, chief of the WPB steel Division iron ore section, has resigned his position because of ill health, H. G. Batcheller, director of the division, has announced.

Mr. Hobart, who lives in Pottstown, Pa., was for many years a blast furnace operator and consulting engineer. His successor as chief of the iron ore section has not yet been announced.

Fairbanks-Morse Man Named To Shipbuilding Division

Washington

• • • Arthur C. Dodge, vice-president of Fairbanks Morse & Co., Chicago, has been appointed production consultant for Marine Diesel Engines in the Shipbuilding Division of the War Production Board, Captain J. O. Gawne, Director, announced last week.

Garber Named Head Of Construction Machinery

Washington

• • • Appointment of M. B. Garber as director of the Construction machinery Division was announced June 26 by Donald D. Davis, operations vice chairman.

63%
of the
CARBOLOY
TRADEMARK
CEMENTED CARBIDE
produced today
for machining
purposes is
used for

CARBOLOY IS
THE REGISTERED
TRADEMARK OF
CARBOLOY
COMPANY, INC.

Cutting STEEL!

"Ploughing" through tough cast armor plate at cuts up to 1 in. deep—drilling gun barrels—cutting off shell—taking interrupted cuts through sand holes and scale—producing a quality of finish on critical parts often impossible to obtain with former tools—holding close tolerances that drastically reduce and often entirely eliminate subsequent grinding—making steels of 400 to 500 Brinell machineable—these are typical of the present day uses of Carboloy cemented carbide tools for cutting steel.

Today 63% of all Carboloy cemented carbides produced by Carboloy Company for machining applications are steel cutting grades. You'll find them in practically every major war plant throughout the nation, turning out steel parts for war at speeds 4 to 5 times faster than former tool mate-

rials, staying sharp up to 10 times longer—increasing production often as much as 300% on the thousands of applications upon which victory depends.

Write today for catalog GT-142 listing Carboloy cemented carbide grades for cutting steel, cast iron and non-ferrous metals available in more than 300 standard Carboloy tools and blanks.

Are You Using

The Right Chip Breaker?

A special film available on design and grinding of chip breakers for carbide tools. One of a series of six films on Design, Brazing, Application and Grinding of carbide tools for use in your training program. Write for folder GT-151.



CARBOLOY COMPANY, INC., 11153 E. 8 MILE ROAD, DETROIT, MICHIGAN

Sole makers of the Carboloy brand of cemented carbides

Birmingham, Ala. • Chicago • Cleveland • Los Angeles • Newark • Philadelphia • Pittsburgh • Seattle

Canadian Distributor: Canadian General Electric Co., Ltd., Toronto, Canada. Foreign Distributor: International General Electric Co., Schenectady, N. Y.

CARBOLOY
TRADEMARK

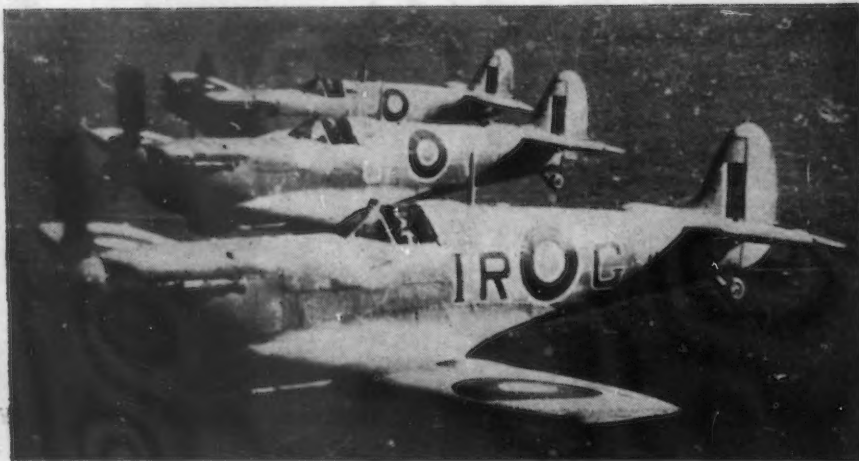


**TITANIUM CARBIDES
TANTALUM CARBIDES
TUNGSTEN CARBIDES**

WEST COAST . . .

OSGOOD MURDOCK

• Los Angeles plant to shift from tank to plane production . . . Kaiser shipyard panned before Congressional committee . . . WPB brass hats blamed for soft pedalling excess inventory charges.



British Combine Photo

NEW TYPE SPITFIRES: Here's the new type Spitfire, with distinctive clipped wings, which is in service with the RAF and has been operating in North Africa.

LOS ANGELES—If you believe it's sinful to report a simple fact without dressing it up with oracle and portent, you can interpret the Army's announcement that General Motors will cease building light M-5 tanks at its local assembly plant and turn the factory over to Douglas Aircraft for production of planes. Is the current air offensive so successful that top emphasis is now being given to plane construction? The attack goal can perhaps be underlined by world affairs experts by simple deduction that, with the exception of cargo and transport planes, Douglas' production consists of bombers.

From a more matter of fact viewpoint, however, the Army's statement that General Motors' tank contract for M-5's is in no wise affected by the change, inasmuch as it will be fulfilled by Cadillac at Detroit, indicates merely that it has been found more practical to concentrate production of tanks and aircraft, respectively, in areas where coordination with other production schedules can better be effected.

The local General Motors plant, located in the industrial suburb of South Gate, started tank production last summer, following a short time lag after cessation of automobile production. At that time, conversion of the plant to aircraft production would not have been practical, since the air-frame plants themselves then lacked equipment and materials to hit capacity in existing structures. The

plant was built in 1936 to assemble the Buick, Oldsmobile and Pontiac lines for the Coast market.

As far as Douglas is concerned, it is now official that peak production has been reached at the company's three big southern California plants. During May, Douglas produced 6548 tons (that is the way the production is expressed by the company free of censorship) of cargo and combat planes. This is 170 per cent more than in May 1942 and 698 per cent above May 1941. In interpreting these figures into units, it must be borne in mind that currently a good chunk of Douglas production is accounted for by its announced participation in the Flying Fortress program, whereas formerly output was dominated by attack bombers.

Douglas has not announced what type of planes will be built at the General Motors plant. In fact, no lease has as yet been signed at this writing. However, General Motors has been asked by the Army to wind up its operations there by September 1.

On the other side of town, Lockheed surprised no one by announcing that production finally had been discontinued on the Hudson bomber. The Hudson was one of the first combat planes to go into production when orders began to roll in from all sides for military aircraft, and the plane bore an unmistakable family resemblance to previous transport models. What it lacked in functional design, it made up partially in fundamental

soundness, as an aircraft, and filled a real gap while other planes, reflecting lessons learned in actual warfare, passed through the drafting and experimental stages. The Ventura, a big brother to the Hudson, but embodying far more refinement, is in quantity production by Vega. If the Constellation, the Behemoth which will replace the Hudson in Lockheed production, can duplicate the Hudson's record of remaining in production for more than five years, the long period of development which has preceded its manufacture will be well worth while. The Constellation, too, incidentally, was originally designed as a high altitude passenger plane.

LAST week in San Francisco a Congressional Merchant Marine committee heard charges of mismanagement and inefficiency by Alonzo B. Bryan, resident auditor for the Maritime Commission since February, 1942, at Richmond Shipyard No. 3, across the bay from San Francisco, which Kaiser Co., Inc., operates. The No. 3 yard is under contract with the Commission to build 30 "convertibles" or transports, and must not be confused with the Richmond No. 1 and No. 2 yards which have made spectacular records in constructing Liberty ships. No. 3 is the so-called permanent yard with graving docks instead of ways and with the finest of warehouse and ship facilities. Last of the Richmond yards to be completed, it has always been found dif-

FOSDICK

JIG BORER

speeds vital
WAR
production



★ As the need for more and more guns—tanks—munitions—planes and other war material increases over our many fighting fronts—our production of these vital materials is stepped up accordingly.

In hundreds of Tool & Die Shops—in Ship Yards—in Munitions Plants—in Airplane Plants you'll find Fosdick Jig Borers operating on round-the-clock schedules to be certain that we get more than enough material, where it is needed most, at the right time.

Precision work—in small lots or in quantity—

can be produced on this Fosdick Jig Borer. Versatile, in the wide range of work it will handle, and fast due to ease of operation, and convenience of control.

This moderately priced machine is of such simple operation that it does not require particularly skilled labor. Investigate it for your jig borer work.

Fosdick Jig Borer Bulletin J.B.A. gives complete details—write for one. Built in two sizes—No. 30 with 36" x 18" table and 30I with 44" x 22" table.



FOSDICK

MACHINE TOOL COMPANY

CINCINNATI, OHIO

difficult to secure enough labor, particularly in the skilled classifications, to man three shifts up to the capacity of the yard. More inaccessible than the No. 1 and No. 2 yards, workers prefer the greater glamor of the first two plants.

TESTIMONY by Mr. Bryan was based on the fact that the first keel was laid at No. 3 on May 14, 1942, and the ship launched in November, but that no deliveries had yet been made although five ships have been launched to date; that 50,000 tons of excess steel was hoarded in the eye-catching warehouses; that the 14 warehouses contained "so much stuff that they can't find what they are looking for"; that between 8000 and 9000 employees imported from other states had dwindled to 2500, and that on the Maritime Commission claim books is a claim for \$600,000 for transportation and expenses of bringing workers from the midwest, of which \$41,000 were lost on those who came "just for the ride"; that mismanagement cost the payroll \$15,000 weekly because men were permitted to leave their posts and be at the gates 15 minutes before the closing whistle; that \$10,000,000 spent by Yard No. 3 cannot be checked because of nebulous accounting methods; that turmoil reigned because "men who had never constructed a ship before were superseding experienced shipbuilders" and that holdovers from the Kaiser contracting days were not proving out in the shipbuilding business.

Ninety per cent of the testimony, particularly that with regard to labor, is typical of street car gossip con-

cerning many big war plants hastily put together, and merely reveals the pathetic efforts of a frantic management to put frosting on a fallen cake.

ON March 18 the regional WPB office, from its San Francisco headquarters, charged that the No. 3 Yard had purchased in excess of its WPB allotments some 32,000 tons of steel, \$2,713,744 worth of electric motors, nearly a quarter of a million dollars worth of wire cable and various other material. At the time these charges were made, Kaiser said from Washington, "I want it to be clear that I am not blaming Donald Nelson, chairman, and Charles E. Wilson, executive vice chairman of WPB. . . . I am sure they had nothing to do with the charges."

Following the initial charges, WPB publicity concerning their prosecution dropped off to a trickle and finally disappeared from the press altogether.

Concerning last week's charges,

Referral Hiring Plan Tried By WMC

Buffalo

• • • After being booted around for weeks, a WMC controlled referral hiring plan went into effect throughout the Niagara Frontier on June 14.

Compelling every male applicant for any kind of work to go to the United States Employment Office for referral to an employer, the inaugural brought a swarm of 1,100 job seekers but members of the Area War Man-

Kaiser said the delay was caused by changes in design, manpower shortages and other reasons. Real Admiral H. L. Vickery of the Maritime Commission came to the defense of Kaiser and explained that "building a C-4 is a hell of a lot different from building a Liberty ship."

Statements Disputed

• • • Statements appearing in the last paragraph of the first column on page 80 in last week's issue, in the West Coast section, have been challenged by the WPB at Washington. This authority says:

"1. No one has ordered Kaiser to convert his pig iron into anything.

"2. He has no equipment for producing billets available at the present time.

"3. Plates are not produced from billets but from slabs.

"4. There is no pig iron shortage on the West Coast."

power Committee reserved judgment on its practicability until it has been given a thorough trial.

Only about 30 firms in the Niagara Frontier area, embracing Buffalo, the Tonawandas and Niagara Falls, were eligible to hire any of the workers because of "priority" ratings based on confidential Army and Navy information. Many applicants refused to accept jobs when they discovered they couldn't pick their plant.

While complimenting the USES staff for its efficient handling of the first crash, labor and industrial members of the area committee warned "this does not mean we approve the plan. We don't."

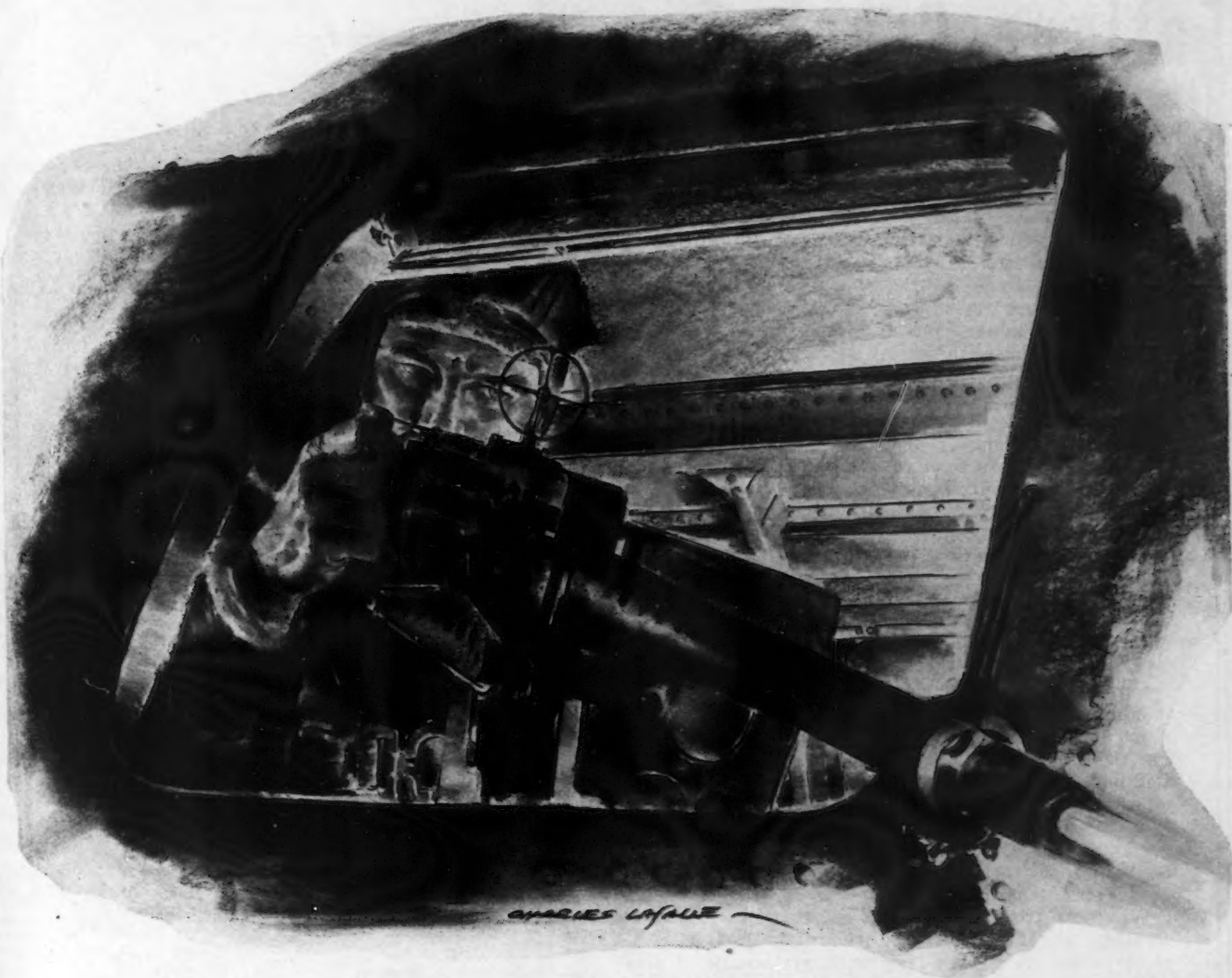
The referral scheme was invoked by Mrs. Anna Rosenberg, WMC regional director in New York, after labor members rejected it flatly because it denied workers the right to shift jobs for higher pay or better working conditions.

It was reported that one out of ten of the first applicants refused to accept jobs because they were not "referred" to plants they "preferred." The plants, not being on the priority list, had to go without.

It was also made clear that the 1000 or more businesses which claimed and received exemption from the mandatory 48-hour work week ordered for the Buffalo area on April 1 by Paul V. McNutt WMC director, would not receive any male workers until they had complied.

British Combine Photo
NEW CONVOY AIRCRAFT CARRIERS: One of the pictures just released of the new type of escort carriers being turned out in increasing numbers for the protection of Allied convoys.





HIS "SCATTER GUN" EATS FROM A NEW FEED BOX!

When the sharpshooter in a bomber goes into action, his pet "scatter gun" literally *pours* .50 caliber shells. These are fed into the machine gun from cartridge belts carefully packed in special ammunition boxes.

Formerly these "feed boxes" were constructed of a scarcer metal. Now many are made of ARMCO ZINCGRIP—a zinc-coated steel with a tightly adherent coating. Because the zinc does not flake or peel when severely formed, it gives protection to the corners as well as the flat parts.

Shells must be safeguarded against contact with corroded surfaces to insure a smooth flow of deadly lead from machine guns. Rust caused by corrosive atmospheres would play hob with boxes made of ordinary metals.

This is only one of many fighting jobs for ARMCO ZINCGRIP and other ARMCO *special-purpose* sheet steels. When you need sheet steels for war-time tasks, or for the products you will make when peace comes, remember there is an ARMCO grade for every requirement.

For complete information on any of these grades, just address The American Rolling Mill Company, 1701 Curtis St., Middletown, Ohio.



THE AMERICAN ROLLING MILL COMPANY

Fatigue Cracks . . .

BY A. H. DIX

Criss Cross Sign Posts

• • • So that you and the other 17 members of this page's loyal army of readers will be among the first to see the shape of things to come, we are now busily engaged in collecting every stray ray of light on the postwar situation.

We have already gathered a whole basketful of flashes, and are trying to arrange them so that they will all point in the same direction, but so far we are finding the going rather hard, as they resist regimentation. Some of the rays are aimed smack into our eyes, and are more blinding than revealing. So we might as well come right out and admit that so far our bundle of flashes is no more than a hodge-podge.

The flash we are fondest of emits from the Committee for Economic Development. It shows three million postwar businesses competing vigorously and merrily. We are, therefore, unhappy to find counterflashes sent out by conservatives who view with horror free-for-all competition in the delicate change-over period, and who intimate that continued aid from Uncle Sam's ever-spilling till will be necessary.

In our economically sophomoric way we had taken a great deal of comfort from zooming savings bank deposits and mounting war bond sales, seeing these as mountains of congealed lubricant to ease the transition from wartime to peace goods manufacture, by providing the wherewithal for the purchase of can openers, Cadillacs, curling irons, copper downspouts and the other items of which the cupboard has long been bare. We are accordingly bewildered by those who do not see these figures as savings but as Government debt and who fear that its rapid conversion into goods would derail our fiscal train.

What we are looking for is some economic Gabriel Heatter who knows all the answers. But until he comes along we will be busy with our bundle of postwar flashes, trying patiently to get them all to run north and south like a package of welding rods, instead of every which way like jack straws.

Gravitation Lawbreaker

• • • In the foregoing we speak of "zooming bank deposits." Zooming, of course, means rapidly rising. You can't zoom down. Which reminds us to remind the *News Front* editors that you can't swoop up. We refer to the *News Front's* June 17 statement, "The Army glider program is swooping up." If the gliders are flying upside down *News Front* is, of course, correct.

They Kidnapped Our Baby

• • • We notice that this week's issue of *Printers' Ink* has a new feature entitled *News Front*. While this flatters us and confirms our suspicion that the editors' selection of a name for the new page was a happy one, we hope the advertising journal will find a substitute, as we saw it first.

News Front was the best of 257 suggestions submitted by members of your favorite family journal's organization. To get that number the editors had to offer a prize of \$10, and as the prize-winning name was submitted by two different persons—Miss Janet Stoddard of the Advertising Dept. and Miss Jane Butzner of the Editorial Dept.—it cost us \$20.

We are happy to offer *Printers' Ink* or any other publisher the free use of any of the six runners-up: *News Dial*, *Newsblast*, *Sign Post*, *The Lookout*, *News Tide*, and *News Pulse*. As tastes vary, we are also glad to offer free what we regard as the six worst: *What's Buzzin*, *Cousin*; *Short Snorts*, *Coupon 17* (*Editorial Footwork*), *What's Cookin'*, and *Off the Cuff*.

Second Front

• • • Of course, *Printers' Ink* could call it the *Second News Front*, which reminds us to mention that Waacs and Army nurses call the life preservers (Mae Wests) they are required to wear while being transported overseas their "second fronts."

Aptronyms

• • • Ed Beebe tells us that the Mars Mfg. Co., Mars, Pa., makes shells. And we hear from Stanley S. (Automotive Council for War Production) Roe that Dr. S. C. Smelsey is a Detroit foot specialist.

Fourth Estate and Potter's Field

• • • Edward H. Robie, who writes the effervescent "The Drift of Things," in *Mining and Metallurgy*, quotes this comment about the reconstitution of Swedish government bodies.

Where earlier the cabinet had consisted entirely of high public officials and big landowners, it now began to include peasants, journalists, and laborers.

His caption is a classic—"Just a Shade Above a Common Bum."

Ferrous Femme

• • • While jackaling we might as well feed on another kill of Ed Robie's: There is in Kitchener, Ontario, according to the society column of a Kitchener newspaper, a Miss Alloys Steele.

Women-In-Industry Dept.

• • • The American Bank Note Company's want ad for "Girls, 17 to 35," furnishes additional evidence on the conventional subdivision of women by ages. As nearly as I can figure it out, the classes run as follows:

Girls	Up to 36
Young women	35 to 55
Mature women	55 to 75
Middle-aged women	75 to death

There are no elderly women.

—Deac

The line-up sounds all right to us, with one exception. No woman, with the possible exception of Dorothy Thompson, likes to be called mature. We suggest:

Girls	Up to 18
Young women	18 to 35
Girls again (second flight)	35 to 65
Middle-aged women	65 on

NE Martini

• • • Did you notice that the ratio bought for the International Food Conference at Hot Springs was 10 cases of gin to 6 of vermouth, in line with the present iniquitous practice of bearing down heavy on the cheap vermouth in order to save the expensive gin?

By any law of reasonable mixing, 10 cases of gin ought to require 3 1/3 cases of vermouth at the most, and 2 1/2 cases, or 4 to 1, would be infinitely preferable. Instead the delegates got a sort of National Emergency Martini, in which the analysis was leaned down as to critical alloys. When it gets that bad, I'll take Scotch and soda, the equivalent of good old carbon steel. Make mine high carbon.

—A. W. M.

The food conference also used 10 cases of rye. Maybe some of the vermouth went into Manhattans.

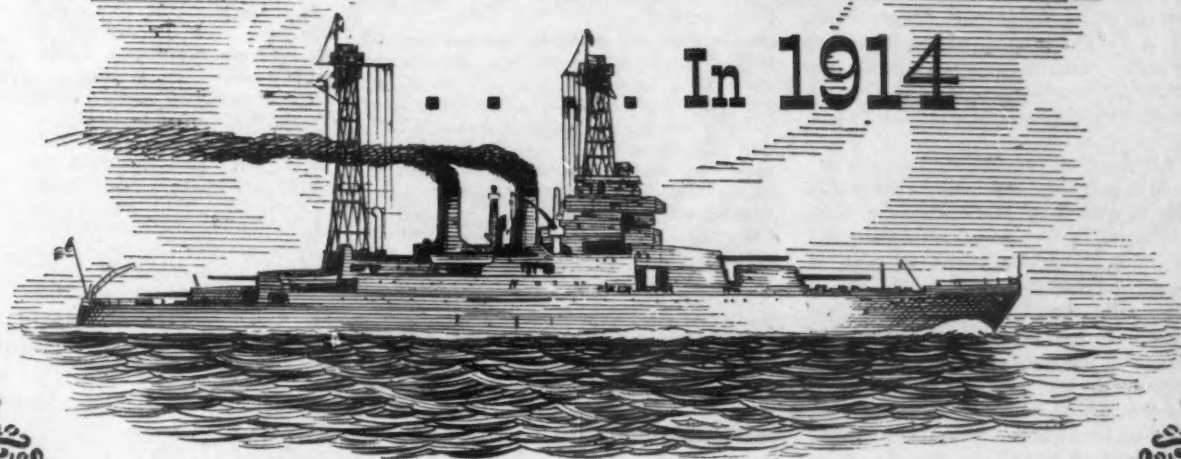
Puzzles

• • • Two answers to last week's problem are $567^2 = 321,489$ and $854^2 = 729,316$.

A Troy, New Yorker, who modestly requests that his name be withheld, answers our plea for problems with this:

A certain pipe can fill a vat in a certain length of time, and a smaller pipe in 3 hours longer. An operator turns the two pipes on together, but when he returns in 2 hours he finds that the vat, instead of being full as expected, is only half full, due to clogging of one of the pipes. Which pipe clogged, and how long was its flow shut off?

She Was A Good Battleship ... In 1914



CRANE BUILDING *has advanced too*

Queen of the fleet in 1914, it was the best that naval engineering could produce. But it can't compete today with swift modern war greyhounds. Improvement has overtaken it. While it is still seaworthy, it is too slow and unwieldy for modern battle.

Cranes have improved too. Those old cranes you may have may be perfectly sound—almost as good as the day you bought them. But they are too slow and unwieldy to keep up with the production speed of the rest of your equipment.

You can increase your plant production—reduce

handling costs, by replacing them with new Northern Cranes. These are faster, more powerful, stronger, have finer control, require much less attention.

MODERN NORTHERN CRANES SPEED PRODUCTION

Faster material handling in greater volume increases production of your whole plant—quickly pays the cost of new Northern Cranes.

Write for details on Northern Cranes—Northern Super-Cranes—Northern Hi-Lift (Low Headroom) Cranes.

Northern **ENGINEERING WORKS**
General Office: 2613 Atwater Street, DETROIT, MICH.

NORTHERN CRANE & HOIST WORKS, Limited • WINDSOR, CANADA

Offices at: 913 South 38th St., BIRMINGHAM • 53 West Jackson Blvd., CHICAGO • 2428 Spring Grove, CINCINNATI • 5724 Navigation Blvd., HOUSTON • 44 Whitehall St., NEW YORK • 555 Union Trust Bldg., PITTSBURGH • 4135 Gratiot Ave., ST. LOUIS • 1679 University Ave., ST. PAUL

NORTHERN SUPER-CRANE

The fine machine, tool of overhead cranes
built for heavy duty, 24-hour-a-day jobs.

Dear Editor:

NO NAVY STEEL OVERAGE

Sir:

You had an item in *News Front*, June 10 issue, stating that the Navy Department had a "cushy" habit of ordering steel for vessel construction with a 10 per cent overage and that this habit resulted in an accumulation of 800,000 tons of excess steel which was overflowing Navy storage facilities.

This was a very unfortunate and inaccurate news item, and on the basis of it, members of my staff have been questioned by representatives of the War Production Board as to why, if this were true, it would not be possible for the Navy Department to reduce its third quarter application for steel products under the Controlled Materials Plan.

As you know, the Navy request for steel for the fourth quarter had not been granted in full by the Requirements Committee of the War Production Board and that I am currently requesting additional allotments of Controlled Materials so that the Navy program may proceed unimpaired, and it is extremely unlikely that I would have requested additional allotments of steel if the Navy had any such excess quantities of these items, as noted in your publication.

S. M. ROBINSON,
Vice Admiral, USN

Navy Department,
Washington, D. C.

● The statement in the June 10 *News Front* that the Navy ordered steel for vessel construction with a 10 per cent overage, and that this had resulted in an accumulation of some 800,000 tons of excess stock was erroneous and should not have been published. We apologize to Vice Admiral Robinson for an undeserved reflection upon his very capable management of the Office of Procurement and Material of the Navy.—Ed.

WORKERS 1, DRONES 50 MILLION

Sir:

Am enjoying most these past few weeks your very frank discussions on Washington and its bureaus. We were jokingly discussing CMP the other day, and the theoretical (?) vicious circle of material and control. With more and more people leaving more and more jobs to control the resultingly less and less material, we may eventually have the population on the WPB controlling the output of one last 4F laborer (or, optimistically, machinist). Why not reverse the process?

HUGH ROBERTSON, JR.
919 Beach Blvd.,
Pascagoula, Miss.

STEEL BOTTLENECKS

Sir:

At what point in the process of manufacture of steel does a bottle-

neck occur? Is it at the ore mines, blast furnaces, open hearths, rolling mills, or transportation?

W. WALLACE BOYD,
Mechanical Engineer
500 S. Highland Ave.,
Pittsburgh, Pa.

● Since we are going to turn out over 90 million tons of ingots this year, there is not much of a bottleneck anywhere along the line. However, the new construction program is running somewhat behind schedule, and, as you may well imagine, any large scale new construction has to be balanced all the way along the line. It is getting this new capacity construction in balance that has caused the difficulty over the past year or so, and will continue to do so until the whole program is completed.

Although still not a bottleneck, perhaps the tightest point in the whole program is in coke oven installations, with the mining of metallurgical coal second, and blast furnace capacity third.—Ed.

HELICOPTER

Sir:

Who makes the helicopter for Igor T. Sikorsky?

AUGUST TORO
Toro Motor Co.,
Pinedale, Wyoming

● Helicopter Division, United Aircraft Corp., Stratford, Conn.—Ed.

CMP FACT FINDER

Sir:

If and when you reprint the CMP Fact Finder published in the June 3 issue, I should like to have a copy for use in connection with The Iron Age Simplified CMP and Priorities Guide.

F. A. KNAPP,
Production Supervisor
American Steel Foundries,
Verona, Pa.

● We have not yet reprinted the CMP Fact Finder, so are sending you a clipping of it.—Ed.

BALED TURNINGS

Sir:

Can you give me assistance in locating the best methods and equipment for disposal of machine shop turnings? I have in mind a system of bins and a baling press with the idea that turnings could be taken in wheelbarrow loads to a storage and baling floor where each type of metal would accumulate until sufficient was on hand to make a bale, whereupon chips would be dumped in the baling press, baled, and sent to storage yard for further accumulation and disposition.

W. W. BROCK
Puget Sound Navy Yard,
Bremerton, Wash.

● The baling of steel turnings is done only to a limited extent. Except for low carbon steel turnings, it is hard to make them "stay put" after they have been pulled out of the baling press. Old auto fenders and other large sheet metal scrap is sometimes used as an enclosure for tough alloy turnings. The fender is laid in the press, the chips dumped on top of it, and the press is

closed. Thus the fender is wrapped around the chips and serves as an envelope. Chip balers of this type are made by Economy Baler Co., Ann Arbor, Mich.; Watson-Stillman Co., Roselle, N. J.; Logemann Bros. Co., Milwaukee, Wis.; Galland-Henning Mfg. Co., Milwaukee, Wis.; Lake Erie Engineering Co., Buffalo, New York; Dempster Bros., Inc., Knoxville, Tenn.; Baldwin-Southwark Corp., Philadelphia, Pa.

A common way of handling steel chips is to crush them in a chip breaker. These chips are known as "short shovel turnings," the name coming from the fact that in this broken form, chips can easily be handled with a shovel. Chip crushers suitable for this purpose are made by American Pulverizer & Crusher Co., St. Louis, Mo.; Pennsylvania Crusher Co., Philadelphia, Pa.; Jeffrey Mfg. Co., Columbus, Ohio; Consolidated Steel Corp., Los Angeles, Calif.

A number of foundries use briquetted chips. For detailed information on this subject see "Current Briquetting Practice," page 31 of the Oct. 29, 1942, *Iron Age*. Chips to be briquetted are first crushed and are then put on a special hydraulic press under extremely heavy pressure. Baldwin-Southwark Corp., Philadelphia, and Milwaukee Foundry Equipment Co., 3250 W. Pierce St., Milwaukee, make hydraulic briquetting presses.

How you handle your chips depends upon the ultimate disposal of them. It would be a good idea to consult local scrap dealers about possible markets for crushed chips and for briquettes.—Ed.

MACHINE TOOL LITERATURE

Sir:

Do you have any literature, pamphlets or any reading matter, on hand about various types of grinders, hand screw machines and lathes? Perhaps you know of a good book that would give me the information.

EMIL H. FICK
707 Greenview Ave.,
Des Plaines, Ill.

● We recommend the *Machine Tool Primer*, published by Herbert D. Hall Foundation, 1060 Broad St., Newark, N. J., price \$1.50.—Ed.

FOUNDRY SCHEDULE

Sir:

Have you any material on scheduling of foundry production, particularly a jobbing foundry?

CHARLES J. DAVIES,
Treasurer
Reading Gray Iron Castings, Inc.,
Reading, Pa.

● American Foundrymen's Assn., 222 West Adams St., Rm. 1398, Chicago, has made some studies of foundry schedules. Suggest you write that organization.—Ed.

SURFACE MEASUREMENTS

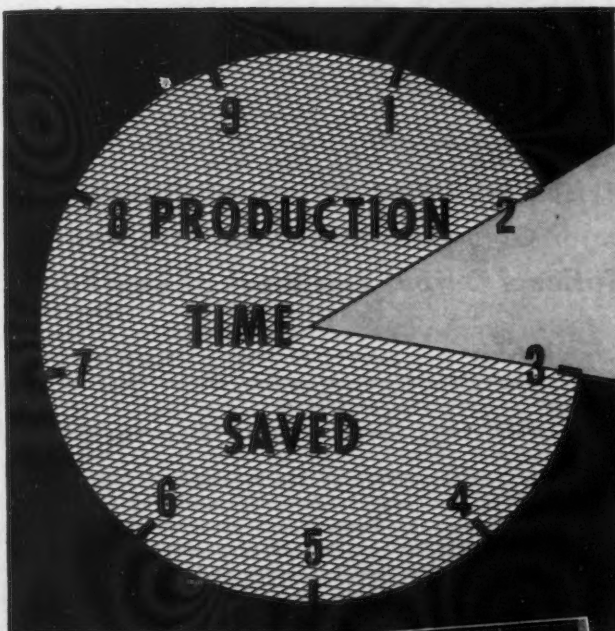
Sir:

Will you kindly furnish us with the names of manufacturers of measuring devices for checking micro finish.

WILLIAM I. ABRAMS,
President
Atlas Tool & Mfg. Co.,
487 Hillside Ave.,
Hillside, N. J.

● The most widely used apparatus is the Abbott Profilometer made by the Physicists Research Co., Ann Arbor, Mich. Another instrument is the Brush Surface Analyzer, made by the Brush Development Co., Perkins and Phillips Avenues, Cleveland.—Ed.

Production Increased 800%



The height of the stack of eight wheels, in the lower picture, compared to the height of the one wheel, shows the *relative* increase in the number of these wheels finished per day, now and formerly. The operation consists of turning the outside diameter, from rim to rim. Formerly, this was done on standard lathes. By putting the job on Monarch-Keller lathes, with electric controls, production was increased 800%. By this method, a thin metal template is drawn over an electrically controlled tracer, and the cutting tool *automatically* follows the specified contour, thus permitting greatly increased speed and accuracy of production.

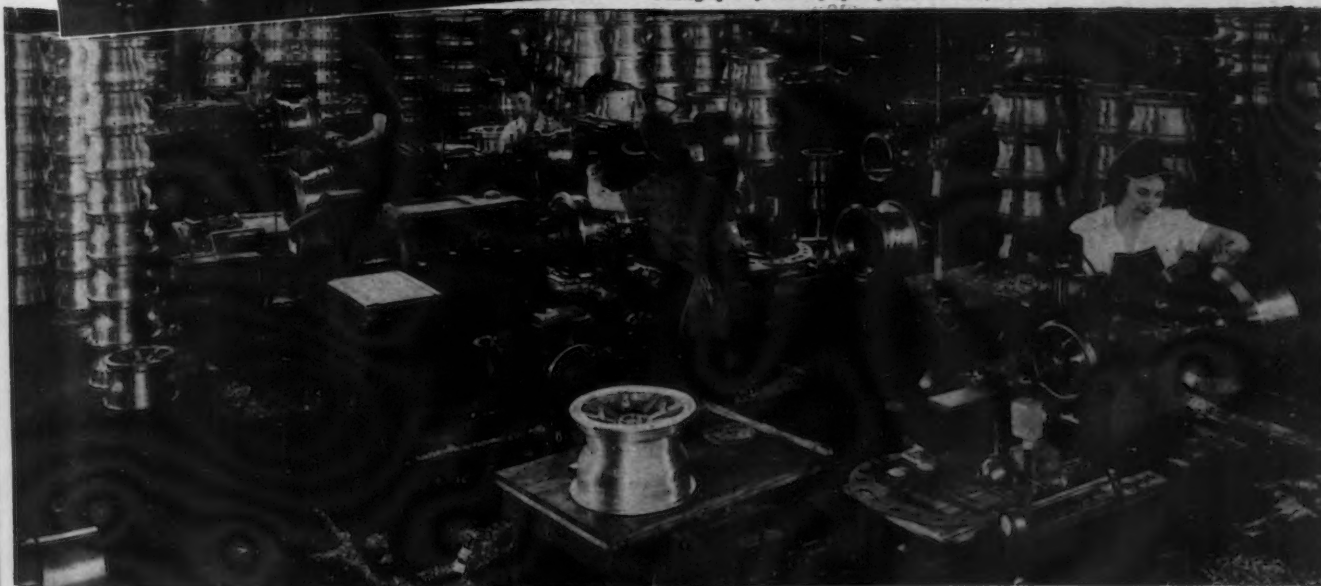
Monarch-Keller lathes are similarly increasing production of many and varied kinds of war work. If we can help you select the right tool for the right job, we'll gladly work with you.

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MONARCH LATHES

Save Time

Photographs by courtesy of Hayes Industries, Inc.



This Industrial Week .

- **Coke Piles Seen Low for Balance of War**
- **Nelson Will Find Directives Disrupted**
- **Ingot Gain Only 2 Per Cent in 6 Months**
- **National Output This Week at Low Point**

ONE hundred and seventy thousand tons of steel lost irrecoverably when a nation is fighting for its life equals a genuine setback. That's what the coal mine strikes have cost so far this year, conservatively estimated, and it isn't the final answer.

A week after John L. Lewis called off the third and most serious walkout, the steel industry still is dangerously low on coal and coke because of the slowness of the miners' return to work. As of Tuesday evening this week the equivalent of 14 blast furnaces still were off at U. S. Steel subsidiaries in the Pittsburgh and Youngstown districts. Coke ovens at Clairton were scheduled for only 70 per cent operations for Tuesday.

It is now feared that coal and coke stockpiles cannot be rebuilt to a point of safety for the duration of the war. Stocks at by-product plants were only 5.4 days in April prior to the big drains caused by the trouble with Lewis. In July, 1939, they equalled 25 days.

So, when Donald M. Nelson, WPB head and other high officials arrive in Pittsburgh Thursday this week to open the campaign for more steel they will find, in addition to depleted coal piles, that the district is operating at the lowest point since May, 1940. They will find WPB steel directives disrupted and other evidences that it is most difficult to maintain production let alone to step it up. They will find that completing the full steel expansion program on time is more of a problem than merely advancing preference ratings. Yet they will find laborers, supervisors and executives of the steel industry anxious to pitch into the new drive, and many of them optimistic that much additional steel can be found for war use, particularly through the drive to get consumers to make use of inventory material.

ONLY a 2 per cent increase in steel ingot output will be achieved in the first six months of this year compared with the same part of 1942. National output this week is 92 per cent, temporarily down 5½ points, lowest since 1940. In third and fourth quarters, barring another coal strike, output is scheduled to rise and for the full year will set an all-time record but will be short of the 92,000,000-ton goal commonly mentioned at the start of 1943. (According to H. G. Batcheller, head of the WPB Steel Division, who will

Brazilian Steel Plant Hastened

• • • Attributed to an easier shipping situation, 170,000 tons of material and equipment for the Brazilian steel plant at Volta Redonda have been ordered from the United States and 21,000 tons already have been sent. This announcement was made in a recent broadcast based on the annual report of the National Steel Co. of Brazil. Forty-six U. S. engineers will go to Brazil to install the equipment. It was stated that construction is well advanced and will be pushed toward producing steel in 1944 with initial ingot capacity of 275,000 tons.

The plant is being built under an Import-Export Bank loan of about \$45,000,000. Priorities were given on material for the plant.

soon be promoted to the vice-chairmanship of WPB in charge of industry operations, the steel expansion program as of July 1 shapes up as follows: Coke ovens, 42 per cent complete; blast furnaces, 56 per cent finished; open hearths, 44 per cent; electric furnaces, 60 per cent; total steel capacity, 48 per cent complete. He said annual steel-making capacity is now about 91,000,000 net tons.) All through the balance of this year the lack of coke will be more or less of an obstacle. Furthermore, the need for repairs on blast furnaces, certain coke ovens and blooming mills is growing more serious.

Testifying to the success of the war against submarines, orders for steel for ship repairs are well below what they were a year ago. The opening of new routes, which are shorter and better protected, has been an important factor in the decline of allied vessel sinkings.

EXTREME pressure is being exerted to produce and ship quickly 500 locomotives to Russia. To hasten the delivery, many locomotives designed for the U. S. Army are being converted to wider gage. Meanwhile, Russian inquiries for around \$15,000,000 in steel mill equipment have reached the letter-of-intent stage. At the same time a steel expansion program in another nation has been set back by the loss of a batch of American electric motors.

With the tank program ahead of schedule and new foreign plants now operating and filling their nations' requirements, domestic railroad equipment companies which were making tanks on a big scale are able to push hard now toward the completion of railroad motive power, rolling stock and accessories.

July 1, an important date for the CMP plan which now becomes fully effective, finds the big problem of balancing steel requirements with supplies still unsolved. Manufacturing economies by contractors are being asked by WPB to help overcome the un-

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balance. CMP Regulation 4 is believed ready for reissue.

Mills have been juggling the problem of unvalidated CMP tonnages with considerable perplexity. By this week it was expected about 85 per cent of most steel backlogs will carry allotment numbers and some of the remaining unfilled tonnage, dating back to 1940 in a few cases, undoubtedly will be suspended.

WPB is expected to issue soon a directive announcing special procedure under which manufacturers of Class A products who are remotely connected with the manufacturing chain, will obtain allotments of materials directly from WPB.

THE cumulative effects of the coal strike and other strikes affecting the steel industry are showing up in unfilled CMP orders being carried over from one month to the next. Since these have preference over other orders, each following month's schedule is getting tighter and the pressure for deliveries is rapidly mounting. Among the causes of carry-overs are: Strikes, hot weather, breakdowns and manpower shortages.

West Coast steel warehouses, long hard put for material and first to institute a pooling system in an effort to supply fabricators in the West, have finally won WPB recognition. Steel mills have been directed to give their orders preference on rolling schedules for the third quarter for certain critical items. . . . Unused allotments at the end of the second quarter are being charged against third quarter allotments. However, unused allotments may and are asked to be returned for reallocation. WPB-3029 is the form provided. . . . Tightened inventory restrictions will also help steel supply. Now all material not actually in production, regardless of minor operations performed before stocking, is inventory and limited to a 60 day supply.

700 Tons of North Africa Scrap Here

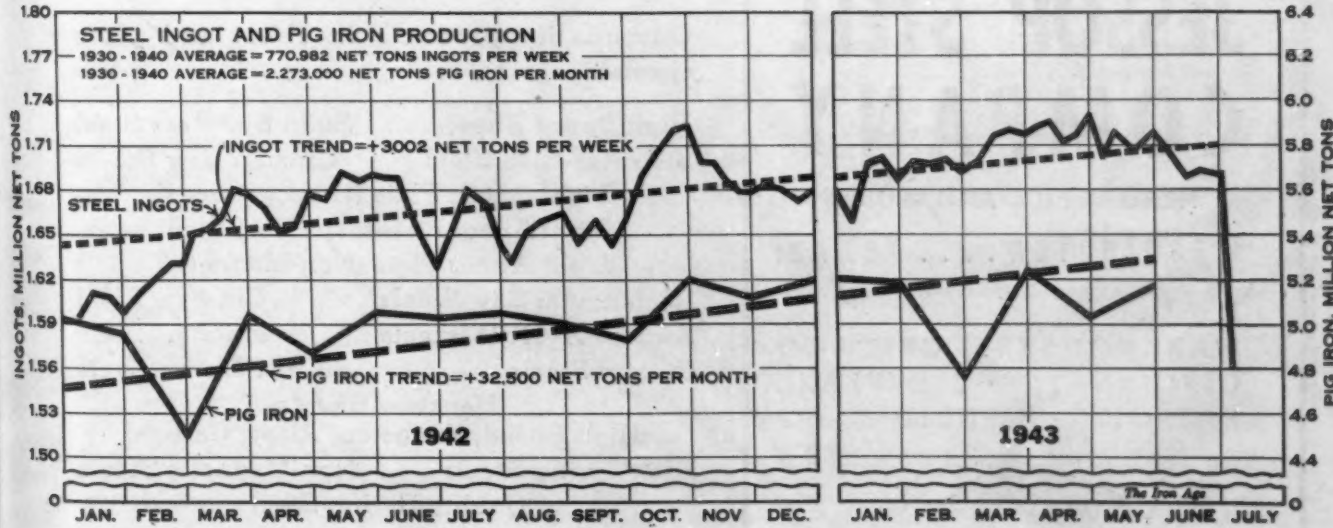
New York

• • • The largest tonnage of ferrous scrap from North Africa, upwards of 700 tons, arrived recently at the Port of New York. Consisting of automotive parts, tractor treads and guns of vintage World War I, this scrap was sold to a scrap broker on his high bid, instead of being allocated to steel mills, as had been done with previous, but smaller, loads brought from North Africa.

Much of this scrap appears to have been taken from the French when they were rearmed. German and Italian arms and parts were among the lot but there was none of American origin.

There is a possibility that much of the scrap in North Africa will not be brought to the United States to feed its furnaces. Instead, it is hoped that if and when Italy capitulates, the scrap can be used to make steel in Italian furnaces for United Nations' consumption.

THE two districts, Pittsburgh and Youngstown, hardest hit by the effects of the coal strike, have declined 15 and 6.5 points in steel production to 80 and 86.0 per cent respectively. Cleveland, the next largest producing area affected, dropped 1.5 points to an operating rate of 97.5 per cent. Wheeling ingot output is down five points to 84 per cent and Birmingham has lost three points from last week to 99 per cent. Detroit operations are off two points to 101.5 per cent and the small Eastern district is down one point to 107 per cent. Because of a strike in the open hearth department of the Alan Wood Steel Co., the Philadelphia steel operating rate decreased half a point to 92.5 per cent. Chicago is the only area to have gained in output. Steel operations there are up half a point to 98 per cent. Cincinnati at 109 per cent and St. Louis at 99 are unchanged from last week.



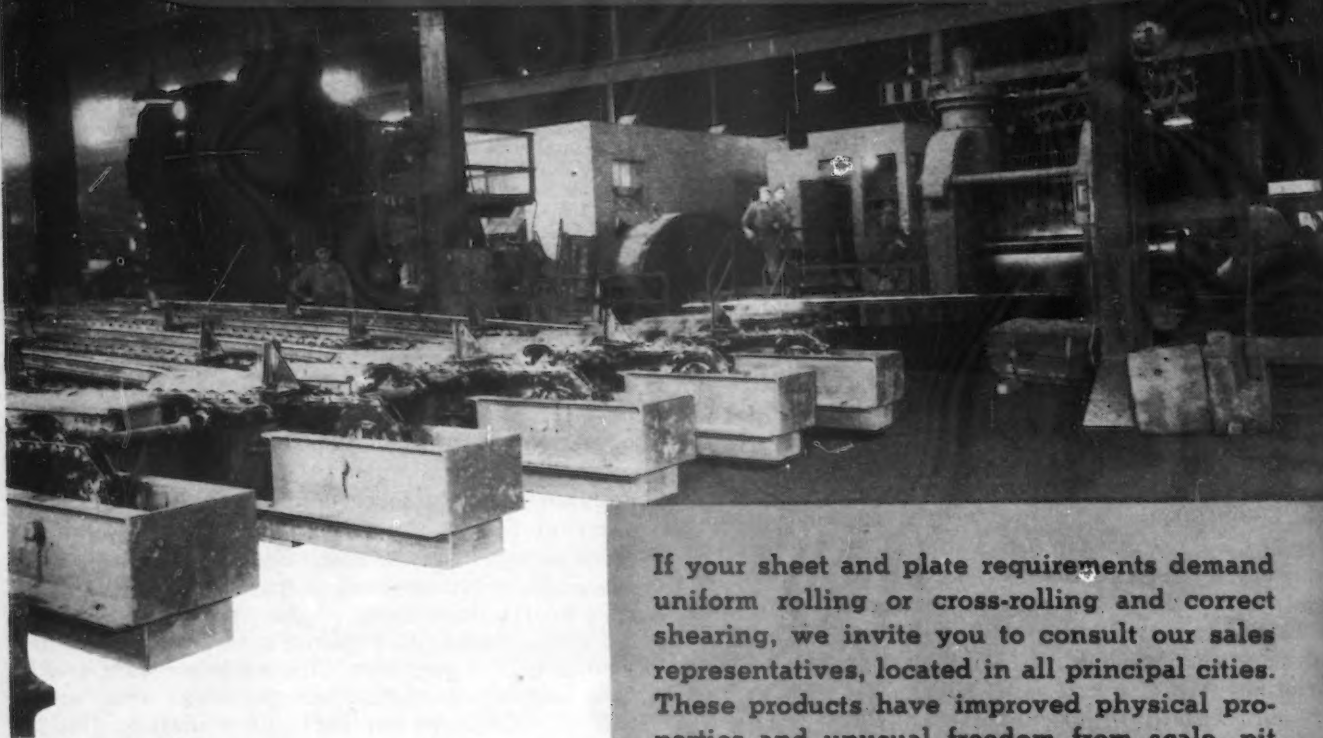
Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	S.Ohio River	St. Louis	East	Aggregate
June 24	95.0	97.5	92.5*	93.0	99.0*	104.5	89.0	102.0	103.5	102.0	109.0	99.0	106.0	97.5
July 1	80.0	98.0	86.0	92.5	97.5	104.5	84.0	99.0	101.5	102.0	109.0	99.0	107.0	92.0

* Revised

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Rectangular Saw Steels	Gin Saw Steel
Aircraft X-4130 Sheets	Magnet Steels
Cutlery Steels	Knife Blade Steels
Hacksaw Sheets	
(High Speed, Tungsten, Alloy, Carbon)	
Back Spring Steels	Non-Magnetic Steels
Quality Spring Steel	
And many other specialties.	

What are your special requirements in grades of electrically melted steel?

Series of Mine Strikes Makes Lack of Coke Now One of Chief Obstacles In Path of Greater Steel Output During Rest of '43

Pittsburgh

• • • Long after the public has forgotten about the three recent coal stoppages (and perhaps even after it has forgotten a possible strike this November), the steel industry will be feeling the effect of these strikes. So will the war effort, but probably very few people will take the time to check back and find the real reason for probable future deficiencies in coal and coke supplies.

The lack of coke, vitally needed in the production of pig iron used for steel making, is now one of the chief obstacles to the realization of greater steel production during the balance of this year and in 1944. The situation was disturbing even before the coal strikes began, but the series of mine stoppages has apparently produced a small amount of weight necessary to dip the scales. As pointed out in *THE IRON AGE* May 20, page 98, there was then no safety factor in national coke supplies for the steel industry.

Factors which are operating against the supplying of adequate coke supplies to the steel industry may be summed up as follows: coal strikes, deterioration in the quality of coal in the greater Pittsburgh area, the working out of good coking coal veins, the decrease in the productivity of coal per man, the affliction of by-product plants with old age, absenteeism, and a growing manpower shortage. It will take the combined efforts of the industry and the government to offset these deterrents to greater steel production.

Some officials in Washington were warned about the coke situation as long as a year ago, but unfortunately little or no attention has been paid to ways and means of alleviating this situation until recently. Even now the subject furnishes material for committee meetings and endless conferences. Impartial observers believe that since the coke question definitely involves the OPA, the WPB, the ODT, the Office of Solid Fuel Administration, and maybe even the OWM, to say nothing of the WMC, there is

little chance of constructive forthright action unless someone takes the "bull by the horns" and either gets fired for his ingenuity or succeeds in getting his points across.

Some scholastic stargazers (and for that matter some people who should know better) have lulled themselves into a false sense of security by pointing to new by-product installations with more to follow. Unfortunately about 99 per cent of this increased by-product coke capacity is already ear-marked for utilization with new or enlarged blast furnace capacity. These additions cannot help the situation with respect to existing blast furnace capacity which is chewing up coke at such a rate as to portend acute shortages in the future unless action is immediately taken to prepare for this probability.

While the quality of coking coal has not suffered in other areas to near the extent which it has in western Pennsylvania, this is scant reason for satisfaction. The Pittsburgh-Youngstown and Wheeling district alone account for at least 41 per

cent of the nation's steel capacity. It is in these areas where pig iron production has not reached the levels it should because of coke quality problems. Reserves are lower, demand is so heavy that almost anything is used, and the mechanization of mining has brought other problems involving coke quality.

The series of mine stoppages has so reduced coal supplies at some points that it will be impossible to build up adequate stocks for safety in case of emergencies for some time, if not for the duration. A prime example of this is the Clairton By-product Works of Carnegie-Illinois Steel Corp. which feeds coke to the Pittsburgh-Youngstown plants of the United States Steel Corp. This plant should have at least 15 days' supply of coal. Last Thursday it had practically none. This forced the banking of additional blast furnaces even



Coal Strike Balance Sheet

• • • Far reaching effects of the three coal strikes, some of which are "intangible" are as follows:

- 1—Loss of steel production in excess of 170,000 tons. This loss cannot be made up.
- 2—Loss of pig iron due to forcing down furnaces furnishing the merchant trade. This cannot be made up.
- 3—Substantial loss in pay to blast furnace and steel workers affected by steel mill curtailments.
- 4—Reduction in coal supplies to such an extent at some locations where stock piles can-

not be built up for the duration to a point of safety.

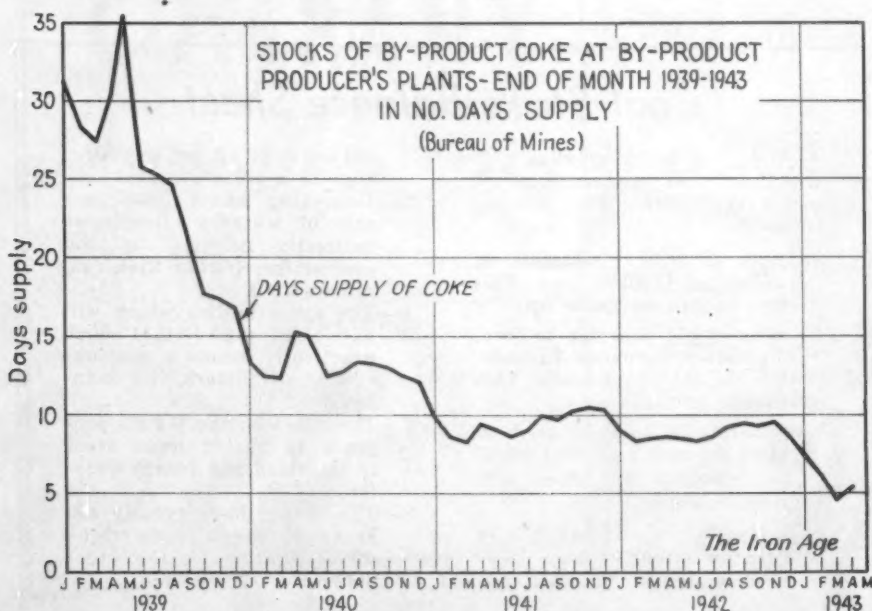
- 5—Damaging effect upon morale of workers directly or indirectly affected by the coal strike. (Other than coal miners).
- 6—The uncertainties which will now exist until Oct. 31 which practically means a prolonged case of "jitters" for management.
- 7—The effect on the WPB's program to obtain more steel in the third and fourth quarter.
- 8—The strikes have greatly aggravated the already tight coke situation in the steel industry.



Pittsburgh Post-Gazette Photo.

Normally coal stocks at the Clairton Works of the Carnegie-Illinois Steel Corp. shown above should amount to approximately 15 days' supply at maximum operations. By Thursday of last week, due to the three successive coal strikes, the coal pile had practically disappeared. Even after the coal strike was reported to have been settled, blast furnaces were forced down due to lack of fuel. The size of future coal piles here will act as a barometer for war production in the corporation's plans in this district.

STOCKS OF COKE AT PRODUCERS' PLANTS: The figures below do not reflect the serious results of the recent coal strikes. Even before that time stocks of coke at by-product plants had reached an all time low in the number of days' supply. While these figures represent an average for the country, it is obvious that many plants are on a hand-to-mouth basis and have no safety factor. The exceedingly heavy demand for coke to make pig iron, coupled with the increased productivity of blast furnaces without a concurrent increase in by-product coke output, has produced a sharp downward trend in coke supplies. Added to this is the increase in the pounds of coke consumed per ton of pig iron produced due to a decline in supplies of good coking coal. Part of the excess production of pig iron over and above rated capacity is being cared for by the utilization of bee-hive coke, the quality of which is deteriorating. Recent coal strikes have done much to place more and more steel companies on a hand-to-mouth coke basis, thus leaving no leeway for winter emergencies such as floods, extreme cold weather and a hold-up in river shipments.



after the coal strike was "alleged" to be over.

The heavy inroads made by the draft which had forced the employment of inexperienced young and old mine workers has affected the productivity of coal mined per man per day. This factor, plus absenteeism, is said to have resulted in a decline in efficiency per man, running as high as 15 per cent. Furthermore, the demand for coal is so heavy that coke producers are forced to accept a product which, under all normal conditions, would be rejected. Users of bee-hive coke have encountered the same situation with various shipments of bee-hive coke to blast furnaces. Ash and sulphur are exceptionally high in some cases and the amount of breeze would cause an old-time Connellsville coke man to turn over in his grave.

Not content with foisting these troubles on the steel industry, the "fortunes of war" have afflicted by-product coke ovens with "industrial hardening of the arteries." Almost 42 per cent of the by-product coke ovens, most of which are part of steel companies' operations, are from 25 to 29 years old. Even the United States Treasury Department admits that a by-product coke oven should hear the death rattle at the age of 25 unless it is torn down and rebuilt. There are by-product ovens today which, if not taken off for badly needed repairs some time within the next six months or a year, will probably just "give up the ghost." It is this possibility which drives by-product coke superintendents either to drink or to the expanding ranks of high blood pressure recruits induced by worry.

The old by-product coke ovens, as well as the new ones, are also in for a lot of battering around due to lack of the right kind of workmen and the increase in absenteeism which feeds upon itself when coal handlers and coke pushers oftentimes are forced to work a 16-hour stretch because their buddies fail to show up. By-product coke oven posts cannot be left without a workman since they are continuous and energy-sapping jobs. The draft has taken some of the younger by-product coke men and the Manning tables say a new man can be trained in three months for coal handling and coke pushing, but the government does not tell them and the steel companies don't know where they are going to get replacements which will refrain from knocking the ovens to pieces or who will

be able to keep up the activity of the former workers. New by-product plants must have some skilled help and even though existing plants need every man they have, they have been forced by circumstances and cooperation to part with some skilled help so that the new ovens will at least have somebody familiar with coke and by-product production.

Behind the by-product coke situation lies similar conditions in the bee-hive coke industry which were detailed in *THE IRON AGE*, May 20, page 98. Coal supplies for the bee-hives are farther and farther away from the ovens. Lack of automobile parts and tires threaten the trucking of coal to the bee-hive ovens. The ceiling price on coke may soon make it impossible for some operators to stay in business. Nevertheless, a ray of hope, even though it is only a glimmer, has come recently to the effect that the government is seriously studying the imposition of an emergency coal freight rate which will bring remote coal to the bee-hive coke producers at less cost than would be the case under present rates. There is a possibility also that when truck transportation of coal to coke ovens breaks down, something tangible will be done, since the ODT has known of this possibility for months and is trying to get parts.

Constructive suggestions to alleviate the by-product coke situation include the increased use of coal washing equipment, the building of additional new by-product ovens on property where no ovens now exist and finally, a concerted drive to increase bee-hive production both in quality and in quantity. Unfortunately, these corrective measures take time. One thing seems to be certain—there will be no unusual increase in either pig iron or steel production in 1944 despite new installations unless far more official attention is directed upon the coal and coke situation. Already coke consumption per ton of iron produced is up seven per cent which is another way of saying pig iron production is down that amount from what it ought to be.

Agitation by coke experts more than a year ago to have governmental agencies restrict the shipment of coking coal to coke producers may be bearing fruit. The Solid Fuel Administration is said to be "studying" this possibility, although it has known about the necessity for it for some time. Hundreds of thousands of tons of good coking coal today are being

W.P.B. Steel Expansion Program Increases in By-Product Coke Capacity (Net Tons Annually)				
Company	Location	In Production	Date Due	Capacity
*Bethlehem Steel Co.	Lackawanna, N. Y.	x		438,000
Bethlehem Steel Co.	Steelton, Pa.		Aug. '43	365,000
*Carnegie-Illinois Steel Corp.	Gary, Ind.		Oct. '43	350,000
Columbia Steel Co.	Geneva, Utah		Aug. '43	1,006,000
Inland Steel Co.	Indiana Harbor, Ind.		Aug. '43	798,000
*Interlake Iron Corp.	Erie, Pa.		Nov. '43	210,000
Kaiser Co., Henry J.	Fontana, Cal.	x		340,000
Koppers-United	Granite City, Ill.	x		305,000
Lone Star Steel Co.	Daingerfield, Texas		Sept. '43	375,000
Pittsburgh Steel Co.	Monessen, Pa.	x		460,000
*Republic Steel Corp.	Chicago, Ill.		Sept. '43	465,000
Republic Steel Corp.	Cleveland, Ohio		Sept. '43	465,000
*Republic Steel Corp.	Gadsden, Ala.	x		400,000
*Republic Steel Corp.	Warren, Ohio	x		375,000
Sheffield Steel Corp.	Houston, Texas		Aug. '43	245,000
Tennessee Coal, Iron & Railroad Co.	Birmingham, Ala.		Aug. '43	375,000
Weirton Steel Co.	Weirton, W. Va.	x		245,000
Total increase in WPB program				7,217,000

Note * Wilputte Ovens. Others are Kopper's Ovens.

This table was reproduced from the June 3 issue of *THE IRON AGE* and was taken from a paper by J. A. Kinney, assistant to the vice-president of Bethlehem Steel Co. It has been altered to show which by-product plants are now in production and when the ones now under construction are expected to be completed. These ovens will in no way help to alleviate the coke situation for existing blast furnace capacity since they are already ear-marked for new and enlarged blast furnace capacity. In addition to the above by-product plants added to steel mill facilities, the following commercial Wilputte ovens were installed in 1942: Semet-Solvay Co., Ironton, Ohio, approximate annual coke capacity—532,000 net tons; E. I. du Pont de Nemours & Co., Morgantown, W. Va., approximate annual coke capacity—455,000 net tons; Tennessee Products Co., Chattanooga, Tenn., approximate annual coke capacity—138,800 net tons. The WPB expansion program does not include some By-product plants installed at steel company plants in 1942.

used as steam coal when other types would do just as well. If coke producers had this tonnage available to replace some of the steam coal they are using, it would help the general

situation. It is estimated that within Pennsylvania alone more than 5,000,000 tons a year of good coking coal is going to consumers other than coke producers.

How Are We Doing?

• • • Coal strikes, steel strikes, expansion hold-ups, hot weather, manpower shortage, repairs, etc., have slowed down steel production increases. The first six months of 1943 will see only a two per cent increase in steel output despite Washington balley-hoo about new units and increased capacity. With the hurdles it faces, the industry will do well to hold at present levels. Here are the figures:

Steel produced last six months of 1942—43,493,998 tons.

Steel produced first six months (estimated) 1943 — 44,200,000 tons.

Per cent of increase is two per cent.

If production the last half of this year is to equal or exceed the first half, such hurdles as a possible fourth coal strike in November, a manpower shortage and a serious coke situation must be successfully overcome.

Miners Begin Returning in Greater Numbers after Loss of Steel Is Huge

Pittsburgh

••• John L. Lewis early this week was still top man, end man, and producer of the national coal strike "show." Although he has called three strikes, there are many who believe that he can even call a fourth without being put "out." Despite his back-to-work order in the middle of last week, the mines in western Pennsylvania which produce coal for coke in the nation's No. 1 steel center found varying degrees of response, ranging from a 25 per cent to a 33 per cent turn-out. Early this week a greater turn-out had materialized but the confusion, rebellion and slowness in the return-to-work movement on this third strike alone will cost the country more than 100,000 tons of steel which is badly needed for war production. It cannot be made up.

As long as three days after Lewis issued his back-to-work order it was necessary to bank the equivalent of 14 large blast furnaces in the Pitts-

burgh-Youngstown area. So few miners returned to work during the latter part of last week that no coal was dumped at Carnegie-Illinois' Clairton Works' coal yard. Instead coal was rushed in cars to the by-product ovens and used immediately in order to keep the remaining furnaces in blast. Jones & Laughlin Steel Corp., which has been hard hit by out-law strikes previous to each "regular" strike, has had its coal and coke supplies reduced to such an extent that its ingot output will be off somewhat this week. Other companies which had a comfortable supply now find there is not enough of a safety factor for future emergencies.

Lewis' attempt to move the date of his contract from April 1 to Oct. 31, if successful, would be the realization of a long-time desire on his part for that date. With a Nov. 1 contract date, Lewis would have a better bargaining period since coal production even in normal times is running along

at peak production in that period. The April 1 contract date during normal times was usually followed by a slack season. The insistence of the WLB that they will not countenance Lewis' new Oct. 31 deadline, and their order that he sign a contract immediately will probably not worry the UMW chief very much. The cold hard facts are simple. The miners have always and probably always will do what Lewis and his policy committee tell them to do. Miners cannot be forced to mine coal if they don't want to. Some labor observers believe that Lewis would not be adverse to a sojourn in jail if he should be found guilty under a War Labor Disputes Act passed last week by Congress over the President's veto. They are sure that he could turn such an event, if it could occur, into a highly profitable one from the standpoint of miners' support.

Meanwhile, the operators who did run the nation's mines have lost out on every major count because they have consistently abided by the WLB's instructions and rulings. They seem to be the forgotten men in the present coal struggle. The portal-to-portal question which was unsuccessfully used as a smoke screen in Lewis' attempt to get more money for the miners was, according to mine operators, settled two years ago when the miners' working day was reduced to seven hours from eight hours with the same amount of pay. There is a possibility that before the coal controversy is settled the operators may lose complete control over their mines for the duration even though they have followed the directions of the WLB.

The country, on the other hand, has been treated to the spectacle of seeing the United States government dilly-dally around on the coal strike question when one of the most urgently needed raw materials has been coal. The government has been on the defensive throughout the entire controversy which has had a tremendous effect on the morale of all other industrial workers. The wag who said that Lewis was trying to move his contract date from April Fool's Day to Hallowe'en was probably deadly serious for the first time in his life.

The President's threat that the draft age limit might be raised to 65 years, thereby making it possible to induct strikers into the Army, and the enactment of the anti-strike bill over the President's veto last week threw consternation into the ranks of the miners. The new statute, effective immediately, outlaws strikes in industries taken over by the government, curbs strikes in other plants by requiring 30 days' notice and a secret ballot, and makes other provisions.

Birmingham

••• As of June 26 only a few of Alabama's coal mines were in operation and little more than 10 per cent

Strike Record Since Pearl Harbor

••• This table was compiled from data of the U. S. Department of Labor's Bureau of Labor Statistics. April and May of 1943 reflect the coal mine walkouts, which also will make June unusually large. Figures for May, 1943, are preliminary.

MONTH	No. of Strikes	No. Workers Involved	No. of Man-Days Idle
1941			
December 8-31	84	16,092	303,312
1942			
January	156	26,929	330,567
February	181	58,122	357,333
March	234	67,292	401,739
April	277	56,038	367,400
May	285	68,820	322,085
June	345	109,611	586,408
July	388	99,676	416,741
August	330	92,226	448,712
September	274	87,904	387,150
October	207	61,593	243,756
November	144	52,481	128,164
December	147	59,269	192,502
1943			
January	195	90,000	450,000
February	210	42,000	170,000
March	260	72,000	230,000
April	395	200,000	675,000
May	395	620,000	1,275,000
TOTAL	4507	1,870,053	7,285,869

* The sharp increase in April and May figures is attributed to the miners' walkout, including 90,000 in Pennsylvania.
(p) preliminary.

of the state's more than 22,000 union miners were working.

At the end of last week Republic officials here estimated they had lost between 3500 tons and 4000 tons of basic iron as a direct result of the latest strike.

Other Strikes

Two strikes struck Gary, Ind., last week at plants of Carnegie-Illinois Steel Corp. One on the company's electrolytic tinning lines as a result of a wage dispute, threw 51 men out of work for two days and cost some loss of production. The second, occurring in the rail mill as a dispute over incentive wages, lasted two days, cost 2400 manhours, and 3896 tons of production.

York Safe & Lock Co., at York, Pa., reported four plants out on strike last week as a result of union friction with a non-union employee. Wright Aeronautical Corp. fired 107 coremakers in their Paterson, N. J., magnesium foundry last week after these men struck and walked out over bonus rates.

Alan Wood Steel Co., Conshohocken, Pa., suffered an open hearth strike involving 230 men last week for a period of 39 hr. over a bonus dispute. About 2500 tons of steel were estimated to have been lost as a result.

Ford Motor Co. had a two-day strike at Detroit involving 1500 foremen resulting from a disciplinary layoff of 25 foremen. No loss of production was known to have resulted.

Buffalo Forge Co. at Buffalo lost one shift in a walk-out of about 500 men last week over contract negotiation delays. Crosby, Shipbuilding, Inc., Fairhaven, Mass., had a brief strike of 250 men.

The entire first shift of 2200 workers at the Highland Park (Detroit) plant of Chrysler Corp. walked out Monday morning. Many workers were returning for the second shift. Temporarily the entire plant was out of production. The walk-out was in protest of disciplinary action to a union steward by the company.

At Kenilworth, N. J., strikers returned to the National Tool & Mfg. Co. this week pending negotiations over seniority for stewards, etc. The stoppage began last Saturday.

Newton Appointed As Director of Mining Operations

Washington

• • • Carl Newton, president of the Chesapeake & Ohio Railway Co., was appointed director of mine operations in an unexpected move June 28 by Harold L. Ickes, Secretary of the Interior and Solid Fuels Administrator for War. Mr. Newton will head the organization being built to operate the government seized mines and will have the same powers and authority as those formerly held by Ickes with relation to mine operations. His first statement emphasized that the mines would be returned to their owners as rapidly as possible and that the government had no plans for nationalized coal mining.

Pittsburgh Rally This Week Will Start WPB Campaign for More Steel

Washington

• • • Previously delayed by the coal strike, which still is keeping some mines idle with a further loss of pig iron and steel, the campaign to make available an additional supply of 2,000,000 tons of steel during the last half of this year will be launched by WPB Chairman Donald M. Nelson, Executive Vice Chairman Charles E. Wilson and Steel Division Director H. G. Batcheller in Pittsburgh on Thursday and Friday. As has been pointed out by THE IRON AGE, it is proposed to increase the availability of steel by 1,000,000 tons each in the third and fourth quarters, most of it to be high quality carbon steel. A large portion of the additional steel

will go to the armed services, Lend-Lease and the Maritime Commission but, it was pointed out, considerable amounts will go to other claimant agencies for transportation, agricultural and similar "home front" requirements. The additional tonnages will be obtained by (1) stepping up production from existing facilities; by (2) expanded facilities and by (3) putting excess inventories to work.

In explaining the necessity for the "steel for victory" campaign, Mr. Batcheller said that for the third quarter of 1943 the various claimant agencies presented allotment requirements totaling about 25,000,000 tons of carbon and alloy steel against an estimated supply of 16,250,000 tons. As a result, he said, all requests had

TEMPORARY RECRUIT?

Hungerford in Pittsburgh Post-Gazette



to be reduced to a considerable degree, and many of the agencies were unable to allot steel for some important programs.

Increasing production from existing facilities, the first phase of the three-point program, will be attempted through the active cooperation of labor-management committees. The next phase, known as "Share the Steel," now under way, is being conducted by the 12 WPB regional offices, to which Steel Division officials have been sent to inaugurate the campaign. The regional offices will send some 250 or 300 agents to approximately 2000 consuming plants to see if steel supplies on hand will permit the elimination or deferment of third and fourth quarter orders on producers' books without interfering with authorized schedules. If the move is successful, and steel circles think it will be the most fruitful of the three sources, additional allotments can be authorized immediately for other war users of steel with the production space thus obtained on steel producers' books. The third point relates to speeding the expansion program by more rapid completion of several electric and of more open hearth furnaces. Mr. Batcheller said that some of these projects, originally scheduled to be brought into operation toward the end of the third quarter, are expected to be producing steel in July or August. Other projects, originally scheduled for fourth quarter operation, he stated, will similarly be moved ahead.

On their trip to Pittsburgh, WPB executives will be accompanied by Philip Murray, president of the United Steel Workers and of the CIO; Theo-

dore K. Quinn, director of the War Production Drive; Joseph D. Keenan, WPB vice chairman for Labor Production; Clinton S. Golden, vice chairman for Manpower Requirements and Harold Ruttenberg, assistant to Mr. Batcheller.

The Pittsburgh Steel Producers' Groups, whose chairman is Benjamin F. Fairless, president of the United States Steel Corp., is actively co-operating with the USW and labor-management committees in arranging for the "Steel for Victory" campaign in the Pittsburgh district, it was stated.

Discussing the drive to get more steel, WPB Chairman Nelson told a recent meeting of the Steel Industry Advisory Committee that third quarter supplies of steel are 26 per cent less than total stated demands and that careful screening indicated that a large portion of this deficit is critical.

"These demands represent what our Army, Navy, Maritime Commission, other claimant agencies and our allies tell us they need in order to win the war," said Mr. Nelson. "The problem is clear: we must try to meet the demand. If there is one further bit of effort we can put into this job, we must not lose one minute of time in doing it."

War Production Drive Headquarters in Washington will keep a running record of the progress made in each plant in increasing production from existing facilities. This will be urged at the William Penn Hotel in Pittsburgh Thursday night at a meeting of labor-management committee members, plant superintendents and union leaders who will be addressed

by Messrs. Nelson, Wilson and Murray. Announcements will be made of comparisons between plants in an area and of comparisons between areas or cities.

Mr. Batcheller said that as a result of the favorable progress of America's war machine, the military program is expanding rapidly and that more and more steel is required to keep the military machine going at its peak momentum. He said that the nation's plant capacity for munitions is in place and ready to go if adequate raw materials are made available.

"Naturally, the most important of these raw materials is steel," he pointed out. "Steel is the backbone of war, and is more than ever the crucial metal in this, the most mechanized of all wars."

The Steel Division Director praised labor and management for a "magnificent job in turning out huge quantities of steel" and said had it not been for this the successes of the American Army and Navy and of the allies would have been impossible.

"We are at the point in war production now where we are ready to strike with our full potentialities. What we need is a 'big push' in steel production to carry us over the top," Mr. Batcheller said.

"We are sending all steel producers a chart of the regional offices, and the Steel Division personnel detailed to each for the purpose of this campaign," said Mr. Batcheller. "It will be most helpful if producers send copies of the chart to their district sales offices, so that they will be able to give their best aid to the Steel Division men who will be working with consumers in their respective territories."

The Steel Division representatives and the regions to which they have been assigned, are as follows:

Region 1, Boston, Robert Marble; region 2, New York, A. Oran Fulton and A. A. Archbald; region 3, Philadelphia, R. L. Parker and J. Larkin; region 4, Atlanta, Ga., H. W. Davis; region 5, Cleveland, A. L. Meyer and M. H. Hoffman; region 6, Chicago, Charles Halcomb and H. M. Evans; region 7, Kansas City, M. M. Chapman; region 8, Dallas, Tex., Dan Lacy; region 9, Denver, M. M. Chapman; region 10, San Francisco, L. E. Creighton and F. T. Cue; region 11, Detroit, S. A. Crabtree and J. F. Reid; region 12, Minneapolis, Charles Halcomb and H. M. Evans.

Mr. Batcheller said that on July 1, in terms of percentages of completion of additional capacity, the steel expansion program would shape up as follows: Coke ovens, 42 per cent; blast furnaces, 56 per cent; open hearths, 44 per cent; electric furnaces, 60 per cent; total steel capacity, 48 per cent. He said that steelmaking capacity is approximately 91,000,000 tons and is increasing all the time.

JAP BARGE FLIES AMERICAN FLAG: Soldiers who made the original landing at Attu found this Japanese landing barge and beached it. The American flag was flapping in the breeze as they clambered over the gunwhales for a look.

Official U. S. Navy Photograph



Batcheller Named to WPB Vice-Chairmanship

Washington

• • • WPB Steel Division Director H. G. Batcheller soon will be promoted to the position of WPB vice chairman in charge of industry operations. Donald D. Davis, president of General Mills, prominent food producer, will take over the vice chairmanship vacated by Ralph J. Cordiner. Mr. Batcheller for the present will continue to have jurisdiction over the Steel Division.

The new position assigned to Mr. Batcheller is one of the most important WPB posts. Some 40 bureaus and divisions will report to him. They include some of the most prominent units in the WPB. It has not yet been determined whether the Copper and the Aluminum and Magnesium Divisions will also report to Mr. Batcheller.

Henry D. Hubbard, 72, Author of "I Am Steel," Dies

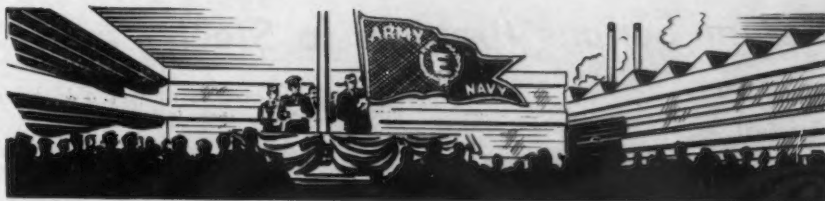
Washington

• • • Henry D. Hubbard, 72, brilliant scientist and former assistant director of the Bureau of Standards, died last Saturday at his home in Chevy Chase, Md. Burial was made in Philadelphia, his native city. Author of the inspired soliloquy "I Am Steel," written for THE IRON AGE, Mr. Hubbard gained national fame as creator of a widely used chemical chart. The chart, known as the Chart of Atoms, is a periodic table of the 92 chemical elements and is the most universally used of any on that subject. For chemistry classrooms throughout the country the chart is a text.

Mr. Hubbard was a former student and instructor of Temple University, Philadelphia. Subsequently he obtained a degree from the Chicago University where he remained after graduation as secretary to Dr. William Rainey Harper, president. In addition to his activities in chemistry, Mr. Hubbard was lecturer on physics.

Youngstown Increases Pig Iron Output 8130 Tons

• • • Youngstown Sheet & Tube Co. as a whole set a new record for pig iron production during May. The pig iron record for May was 8130 tons more than the previous monthly record which was made in December, 1942.



... Cited for Awards ...

National Malleable & Steel Castings Co., Indianapolis, Works, Indianapolis.

National Tube Co. plants at McKeesport, Pa., and Ellwood City, Pa. (white star)

Aviation Corp., Republic Aircraft Products Division, York and Federal Streets Plants, Detroit.

Worcester Pressed Steel Co., Worcester, Mass.

Sullivan Machinery Co., Michigan City, Ind.

National Battery Co., Gould Commercial Division, Depew, N. Y.

S. G. Taylor Chain Co., Hammond, Ind.

Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.

U. S. Catheter & Instrument Corp., Glens Falls, N. Y.

Ace Mfg. Corp., Philadelphia.

American Finishing Co., Memphis, Tenn.

American Smelting & Refining Co., Garfield Smelter, Garfield, Utah.

Automotive Maintenance Machinery Co., Chicago.

Brighton-Advance Corp., Brighton-Advance Plant, Brighton, Mich.

Cannon-Kocka Co., Cleveland.

Cincinnati Gear Co., Cincinnati.

Crosse & Blackwell Co., Baltimore.

Darlington Veneer Co., Inc., Plants No. 2 and No. 3, Darlington, S. C.

Detroit Gasket & Mfg. Co., Burt Road Plant, Detroit.

Diamond Calk & Horseshoe Co., Duluth.

Eugene Dietzgen Co., Chicago.

E. I. du Pont de Nemours & Co., Inc., du Pont Plant, Du Pont, Wash., and Oklahoma Ordnance Works, Pryor, Okla.

Eastern Rolling Mills, Baltimore.

General Electric Co., Plastics Department, Plant #1, Pittsfield, Mass.

General Instrument Corp., Elizabeth Plant, Elizabeth, N. J.

General Machine Co., Newark Plant, Newark, N. J.

Hammond Iron Works, Warren, Pa.

Heintz & Kaufman, Ltd., South San Francisco Plant, San Francisco.

Heywood-Wakefield Co., Gardner, Mass.

Jacobs Mfg. Co., West Hartford, Conn.

Kendall Co., Kendall Mills Division, Griswoldville Plant, Griswoldville, Mass.; Kendall Mills Division, Slatersville Plant, Slatersville, R. I., and Kendall Mills Division, Walpole Plant, Walpole, Mass.

Lisle Corp., Clarinda, Iowa.

Pepperell Mfg. Co., Fall River Division, Fall River, Mass.; Lindale Division, Lindale, Ga., and Opelika Division, Opelika, Ala.

Remington Rand, Inc., Sangamon Ordnance Plant, Illinois, Ill.

United States Bronze Powder Works, Inc., Closter, N. J.

United States Pipe & Foundry Co., North Birmingham Works, Birmingham, Ala.

United States Potash Co., Carlsbad, N. M.

Vermont Marble Co., Proctor and Center Rutland Plants, Proctor, Vt.

BOAT-TRUCK: This amphibian truck, the "duck," made by General Motors Truck & Coach Div., has a standard 6-wheel drive chassis which carries a water-tight steel hull. Land speed is approximately 50 miles, water speed six miles an hour.



Inductions of Next Six Months Present Serious Problem to Steel

New York

••• Just at the time when OWM and WPB are pleading with the steel industry to find a way of producing considerable extra steel tonnage in the remaining quarters of this year, the industry is confronted with one of the most serious manpower problems yet to appear as envisaged from latest Selective Service statements of requirements.

Apparently within the next six months at least one-half of the deferred workers will be drawn off for the armed forces, according to figures given by WMC Chairman Paul V. McNutt, stating that of 3,000,000 industrial deferments now in force (other than agricultural) only about 1,500,000 will be permitted after Dec. 31. Very few key positions will be considered deferrable on Replacement Schedule which are to be used after July 1.

After Dec. 31 the total quota of

the armed forces is expected to have been reached and future demands of Selective Service are not expected to exceed the necessities of replacements for casualties and a further call for women to replace able-bodied men. One estimate has placed the monthly call after Dec. 31 at about 125,000 per month.

While this picture seems to hold out some signs of succor for labor-poor industries the problem presented by the terrific drain on manpower over the next six months must be handled as efficiently as possible. The best recommended practice is the early filing of Replacement Schedules and Manning Tables.

The Manning Table, being a plant-wide survey of personnel needs, is very important to the employer in determining just how grave his plight may be with regard to draft losses. The Replacement Schedule, on the

other hand, is the best protection the employer can have as it lists all employees liable for military service and states how readily the individual worker can be replaced. This serves as a guide for local boards in granting deferments and qualifies deferment pleas the employer may make.

The new Replacement Schedule to be placed, beginning July 1, will give local draft boards a fresh picture of the replaceability of every listed employee who might otherwise be immediate material for induction. To maintain quotas it is believed that the local boards will scrutinize all claims made on these Schedules with a sharp eye, but bonafide cases of necessity and hardship will still be observed. If not already done so, Form 42-B should be filed for every employee of military age, including fathers, proving his employment in an essential industry. This also demands that the local board give notice to the employer 15 days in advance of a change in an employee's draft status. When actual deferment is indicated by irreplaceable need for the employee or for other reasons then Form 42A should be filed as the actual deferment request. The Replacement Schedule which should then be on file with the local board may justify the deferment request, depending on the replacement picture it has presented. Other than this, a stepped-up training program based on the use of men over 38, 4-F's and women seems to be the only answer.

REPLACEMENTS ARE DIFFERENT: By July 1 the new employee Replacement Schedule form must be used. Column heads of the new form (below) indicate the differences in the groups of employees that can be considered for deferment. The previous form (top) is shown for comparison.

REPLACEMENT SUMMARY												
List of Jobs—Selective Service Status of Workers												
Company		Date										
Plant		Signed										
Location		Title										
Line No. or code	List of Jobs (job titles)	Number of women	Number of men not now to be considered for replacement on Example B					Number of men to be considered for replacement on Example B			Total of all workers	Anticipated maximum number of workers (optional)
			Men with minor children	Class 4-F	Over age	Under age	Total Cols. 4-7	Single men	Married men with out children	Total Cols. 9-10		
1	2	3	4	5	6	7	8	9	10	11	12	13

PLANT					SHEET OF SHEETS						
Line No.	Plant Job Title	Dictionary Code (Optional)	Total Number of Workers	Number of Women	Male Workers 38 or Over—or Under 18			Male Workers 18 Through 37			
					45 and Over	38 Through 44	Under 18	Physically Disqualified	With Children	Married Without Children	Single
1	2	3	4	5	6	7	8	9	10	11	12
	DETAIL MFG. DEPT. MACHINE SHOP										
1	Foreman		8		2	4		1		1	
2	Subforeman		15		4	3		3		3	2
3	Leadman		37		3	6		1	19	2	6
4	Screw machine operator		48			6	1	2	10	21	8
5	Engine lathe operator		58			7	3	3	7	11	27
6	Drill press operator		211	42	4	6	61	5	20	41	32

Helicopters May Become Air Buses; Trial Operations Planned in Michigan

Chicago

• • • Another step in the fast developing picture of the helicopter as a post war factor was the recent announcement by the Greyhound bus lines that application had been filed with the Civil Aeronautics Board for permission to operate helicopters or similar craft in a nation-wide network of helicopter buses.

This announcement followed an earlier report that Nash-Kelvinator Corp. had completed arrangements with the Army air forces for quantity production of Sikorsky helicopters (see *THE IRON AGE*, June 17, p. 78).

The Greyhound plan envisages use of helicopter routes as feeder systems for established airline routes, with landings possible on flat roofs of present bus stations and other downtown buildings, as well as at airports.

Although lack of equipment may delay the development of this plan, bus line officials have expressed the hope that they will be able to obtain use of several of these craft in the near future for experimental purposes. The first experimental lines are planned to run between Detroit and Flint, Mich., and between Detroit, Cincinnati and Louisville, Ky.

If the company's application is approved, the first craft used for this purpose will probably carry seven passengers, a pilot and luggage. Eventually it is hoped to use ships capable of carrying 14 passengers, two pilots, mail and baggage.

These air buses probably will have a speed of between 75 and 90 miles an hour. Operating rates are estimated to be around 4c. a mile, or slightly below airline rates but higher than present Pullman rates.

In addition to the activity of Nash-Kelvinator, which will build a ship designed by the Sikorsky Aircraft Division of United Aircraft Corp., it is reported that Consolidated Aircraft Corp. is also getting ready for production of a form of helicopter. Consolidated's work in this direction is centered around Bill Stout, a longtime helicopter enthusiast. The Stout Engineering Laboratories, which Stout heads, was recently purchased by Consolidated.

Applications before the Civil Aeronautics Board for permanent certificates to operate helicopters or other civil aircraft lines include:

The Greyhound Corp., Chicago—Filed June 14, 1943—to operate nation-wide lines by "helicopters or similar aircraft over 78 routes, carrying passengers, mail and express." Corporation negotiating with manufacturers for construction of aircraft now being jointly developed by Greyhound engineers and manufacturing companies. Routes will supplement existing bus and airline service and parallel present highway service. Robert Driscoll, vice-president, Chicago.

Skyway Corp., Providence, R. I.—Filed May 25, 1943—to operate short-haul helicopter service, carrying passengers, mail and property, in Connecticut, Massachusetts, New Hampshire, New York and Rhode Island. H. L. Weller, secretary, 1030 Hospital Trust Building, Providence.

Angeline Harris, as individual, Rutherfordton, N. C.—Filed May 25, 1943—to operate autogiros, helicopters, aerocoups, and when necessary, conventional airplanes, in North Carolina, South Carolina, Tennessee and Virginia, carrying mail and passengers.

Southwest Airways Co., Beverly Hills, Cal.—Filed May 20, 1943—to operate three routes (165 miles) carrying mail and property by use of helicopter from the Los Angeles Air Terminal at Lockheed Air Terminal to post offices in metropolitan area of greater Los Angeles. Route terminals are Santa Ana, Long Beach and San Pedro. Will use helicopters of R-5 type, built by Sikorsky Aircraft Corp., Bridgeport, Conn. John H. Connelly, president and chief executive officer. James G. Ray, vice-president, 9200 Wilshire Blvd., Beverly Hills, filed application and communications from CAB are sent to him.

Philadelphia & Eastern Airlines, Inc., Philadelphia—Filed May 4, 1943. To operate 10 mail, passenger and express routes: (1) Elmira, N. Y.-Philadelphia; (2) Binghamton, N. Y.-Philadelphia; (3) Philadelphia-New York, via Easton, Pa.; (4) Philadelphia-New York via Trenton, N. J.; (5) Philadelphia-New York via Camden, N. J., and Lakewood, N. J.; (6) Philadelphia-Norfolk, Va.; (7) Norfolk-Philadelphia; (8) Clarksburg, W. Va.-Philadelphia; (9) Washington, D. C.-Harrisburg, Pa.; (10) Washington-Philadelphia. Proposed to use Sikorsky helicopter when available and the ordinary type plane requiring landing field with runway for pick-up service where feasible. Filed by Walter C. Miller, 651 Juliet Avenue, Lancaster, Pa.

William B. Allen, as individual, 4527 Nebraska, Ave., N. W., Washington, D. C.—Filed April 22, 1943—to operate mail and passenger service over six routes to each first and second class post office in New York, New Jersey, Pennsylvania, Maryland, Delaware and District of Columbia, except that where the centers have more than one first or second class post office P. O. Department will be asked to suggest number of post office stops within the center of population. Contact has been made with Igor Sikorsky of United Aircraft Corp., with a view to getting helicopters.

Northeast Airlines, Inc. (S. J. Solomon, president), Commonwealth Airport, East Boston, Mass.—Filed April 8, 1943—to operate mail and property service by helicopter or other aircraft capable of landing on roofs of post offices or railroad stations as small as 100 ft. square in New England and New York points. New England states are Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.

Burlington Transportation Service subsidiary of the railroad applied June 26 for authority to operate 6380 miles serving 13 western states.

AILERONS IN PLACE OF REFRIGERATORS: Workers in the Westinghouse plant at Mansfield, Ohio, who used to make ranges and refrigerators now turn out ailerons for Republic P-47 Thunderbolt fighter planes.

Westinghouse Photo



New Salvage Drive Coincides with OWM-WPB Call for Greater Steel Tonnage

New York

• • • Coordinating perfectly with the recent OWM-WPB request for a large additional steel tonnage in the third and fourth quarters of 1943, the Industrial Salvage Branch of WPB has announced the beginning of a new campaign to salvage millions of tons of industrial, remote and dormant scrap. The campaign which is being organized through the offices and facilities of the WPB's regional salvage managers covers plans to canvass the industry for dormant material in a new drive and includes an educational-promotional plan designed to attain more complete segregation and preparation of turnings and borings.

Remote accumulations of scrap will soon be directly allocated to consumers under a new plan announced by Donald Nelson. Under his plan, one industry representative will be appointed as a "district clearing agent" for each of a number of consuming districts whose duties will consist of expediting the movement of accumulations of scrap. Such expediting may be either to consumers in the particular area or by allocation to other areas. The Salvage Division will notify the Steel Division in cases where accumulations do not move in the proper manner and the Steel Division by contacting the district clearing agents will determine whether the material can be utilized in the particular area or some other district. When this information is complete

and a district clearing agent has supplied information showing where the scrap can be used, the Steel Division will issue allocation orders for movement of the accumulation.

Operating much the same as formerly, the regional salvage managers of WPB with the cooperation of salesmen and executives in the steel industry will again embark on an intensified drive to clear plants and yards of obsolete material and dormant scrap. This drive is already under way in some districts and will soon be operating again at full tilt throughout the nation.

Adding to the already rather large fund of information available on the subject of salvaging, the WPB Industrial Salvage Branch is also issuing a new educational booklet—"The Salvage Manual for Industry" which will be distributed to all manufacturing plants both large and small within a short time. The manual includes valuable information on the organization of salvage departments for small plants that have not heretofore had such organizations as well as much technical information on segregation, grading and preparation.

A major part of the salvage campaign is built around attaining the remelting of approximately 7,000,000 tons of the most troublesome of all scrap grades—machine shop turnings—along with borings. Through improved methods of turnings and segregation preparation the WPB hopes

to enable steel producers to assimilate the entire production of turnings thus salvaging this vast tonnage of otherwise lost metal and possibly speeding the production of steel toward the new production goals set by WPB.

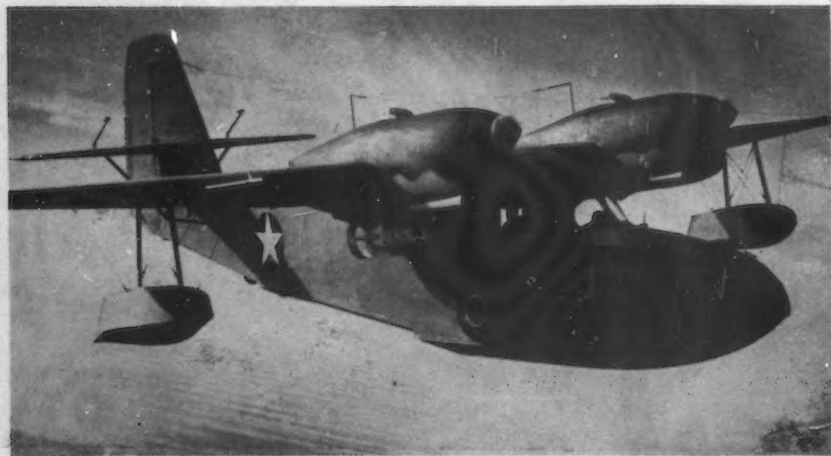
Latest estimates from the Institute of Scrap Iron and Steel indicate that turnings and borings production this year may amount to 5,000,000 tons in carbon steel grades and 2,000,000 tons of alloy steel grades, a total more than doubling the 2,900,000 tons produced in 1942. This relatively small total for 1942 was considered at that time to be the maximum that could be consumed by steel producers but the WPB believes that through accurate segregation and crushing, the anticipated 1943 total of 7,000,000 tons can be utilized.

Basis of the plan consists of laying down a method by which all turnings will be accurately segregated during production and later crushed by the producer for maximum usability. Aside from the necessity for segregation which is easily understood, direct encouragement by RFC funds if necessary is going to be used to urge producers of turnings to install crushing equipment. The advantage to the ultimate consumer may be seen in the fact that four charging boxes full of uncrushed machine shop turnings may weigh as little as 1500 lb. while the same measure of crushed turnings will weigh approximately 7500 lb. Beyond this reason, the extreme bulk of bushy turnings has caused open hearth operators to avoid them due to excessive oxidation, affinity for sulphur picked up from the furnace fuel and their property of filling up a furnace without representing a worthwhile tonnage. Likewise blast furnace operators have found that long and bushy turnings will not properly pass through the loading bell of the furnace. Crushing is seen by WPB as the answer to these difficulties which have made melters reluctant to buy.

Segregation is hoped to be attained through color-system identification cards and painted ends of bars which will denote the steel grade and be carried with the steel from delivery to the machine tool through every movement of the particular scrap produced until preparation and sale or reuse of the scrap has been accomplished. While similar to the methods already established in many plants with established scrap segregation methods this plan is expected to blanket all those plants that have not

COAST GUARD PATROL: A U. S. Coast Guard "Sea Bird" patrols Pacific waters for any sign of enemy activity or other hazards to navigation. Depth charges are tucked beneath the wings of the plane, ready for use.

Harris & Ewing Photo



been fully systematized and thus gain more complete segregation on an industry-wise basis.

Regarding crushing equipment, Merrill Stubbs, chief of the WPB Industrial Salvage Branch, points out that there are at present about 250 steel turnings crushers in the nation of which 90 per cent are in the hands of turnings producers, 9 per cent in consumers' plants and one per cent in the dealers' yards.

Crushing by the producers is favored as it permits plant loadings of maximum car weights of 100,000 lb. whereas light turnings often load at only about 30,000 lb. WPB pointed out that fully loaded cars permit greater shipping distances because of lower freight rates for a given bulk, which affords greater marketability plus the saving of one of three cars otherwise required by light loading. Double hauling is also avoided when turnings can go direct from producer to consumer without reshipment by a dealer occasioned by lack of preparation.

The operation of this plan is not expected to affect scrap dealers' business as they have not previously entered into deals with plants producing enough turnings to warrant use of a crushing machine by the producer. On the other hand, even if small producers were inclined to crush their own scrap, the dealer would benefit slightly by having more compact loadings when hauling from the plant.

54 Locomotive Parts Termed Critical Components

Washington

Beginning July 1, the delivery of fifty-four critical locomotive equipment components can be made only in accordance with schedules approved by WPB.

The action, Limitation Order L-97-d, was taken to insure the successful completion of the 1944 locomotive building program. Other factors necessitating the action were the need for components for exports, repair parts and units for modernization and conversion of existing equipment. The move is expected to relieve a current tight situation in the components covered.

Under the order, WPB may direct the return or cancellation of any order on the books of a manufacturer, may direct changes in the delivery or production schedule of a manufacturer and may allocate orders placed with one manufacturer to another.

Collisions Due to Great Lakes Fogs Cripple Ore Fleet; Still Far From Goal

Cleveland

Old man weather, as persistent as ever, still refuses to relinquish his grip on the Great Lakes, and is the chief cause of a series of accidents that threaten to disrupt ore shipments, already behind schedule. Past two weeks have seen two sinkings involving ore boats. The ore carrier, *George M. Humphrey*, sank in a collision with the *D. M. Clemson* of the Pittsburgh Steamship Co., in the Mackinac Straits, while the *W. D. Calverley, Jr.*, was damaged in a collision that sank the grain carrier *Brewster*, a British owned vessel in the St. Clair river.

These were the two most serious of the accidents that have occurred in the past two weeks involving some 15 ships, laying them up for periods ranging from one to four weeks. Fog and bad weather conditions were in almost every case the cause of the troubles. A previous accident two weeks ago in which one of the Pittsburgh Steamship Co.'s new boats, the *Irving S. Olds* rammed the *C. O. Jenkins*, a Midland Steamship Co. boat, turned out to be a first-class thriller. With the vessels lashed together, the crew of the *Olds* navigated the two boats 28 miles to Cleveland.

Meanwhile, the vessels that are in service are plugging along at top speed

The *Irving S. Olds* brought down this week a cargo of 17,817 gross tons,

bill of lading weight, of iron ore. During the week ending at 7 a.m., June 14, Pittsburgh Steamship Co. arranged for the floating of 1,285,000 gross tons of ore, the largest tonnage ever loaded in owned and chartered vessels of the company in any one week.

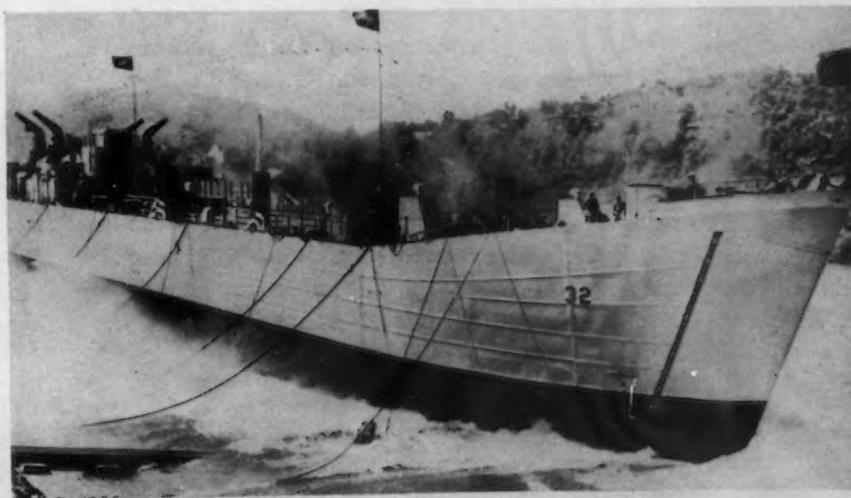
Latest reports of C. C. Lindeman, statistician of M. A. Hanna Co., on the Great Lakes ore vessels indicated that of the 310 American boats in commission, only 292 are in the ore trade. Of the 35 Canadian ships that were in American ore trade at the end of the season last year, there are only two this year.

All in all, the ore fleet stands a pretty slim chance of catching up on downlake shipments of ore to meet the 91,000,000-ton goal set for iron ore this year. With the boats laid up for repairs, slower operations because of weather, and some boats now carrying grain instead of ore, the goal appears more remote every day. Of the new Maritime Commission boats, there are only four in service at the present time, but it is likely that five more will go into service shortly.

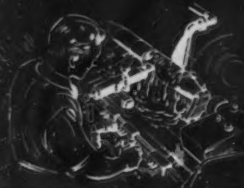
To June, 12,873,807 gross tons of ore have been docked at Canadian ports and Lake Erie docks. During the same period, ore consumption has been about 9,780,000 tons, leaving a stocked balance of slightly more than 3,000,000 tons or less than one-half month's supply of ore.

NAVY TANK CARRIER: Craft like the one pictured here are known in the Navy as LST's (landing ship tank). When these ships hit the beach, the bow opens, and tanks roll out, ready for battle.

Wide World Photo



RUTHMAN



Gusher Coolant Pumps

THE OUTSTANDING COOLANT PUMP TODAY

FEATURES

- 1 precision ball bearing
- 2 standard interchangeable stator
- 3 precision ball bearing
- 4 rigid one-piece shaft
- 5 removing these screws permits lifting pump and motor assembly for inspection.
- 6-7 twin intakes are automatically cleansed when pump is throttled
- 8 internal louvers and revolving cup disc protect motor
- 9 conduct wiring connection
- 10 centrifugal lock nut and seal prevent moisture from reaching bearing
- 11 double acting impeller
- 12 heavy mounting flange cast in one piece with impeller housing
- 13 internal discharge thru center of intake eliminates outside piping



Look over these features and you will see some of the reasons behind the excellent performance of Ruthman Gusher Coolant Pumps. When the pump is new you get flexibility and range of control that provides a trickle or a gusher stream instantly without priming.

And more important, when the pump becomes several years old you will still get the same satisfactory service because Ruthman Pumps are noted for freedom from maintenance attention. Keep cool with Ruthman Gusher Coolant Pumps.

The
RUTHMAN MACHINERY COMPANY
CINCINNATI, OHIO

NEWS OF INDUSTRY

Lost: 43,520,000

Wartime Man-Days

New York

• • • Absenteeism in March caused the loss of 43,520,000 man-days in American industry, according to the National Industrial Conference Board compared with 39,320,000 man-days lost in February. This represents an average absenteeism loss of 0.9 days for men in March, as compared with 0.8 days in February. The March figure for women was 1.3 days lost against 1.2 in February.

• • • Earnings and payrolls rose to new peak levels in April, according to the National Industrial Conference Board. Total man hours worked remained at the March peak level. Hourly earnings of workers in April averaged \$9.97 and were 1 per cent higher than in March. Since January, 1941, the base month of the "Little Steel" formula, they have advanced 31.4 per cent.

New Reports Issued To Steel Plate Producers

Washington

• • • New instruction for preparation of reports on Forms WPB-652 and WPB-653 have been issued to steel plate producers, cancelling and superseding instructions of May 21st.

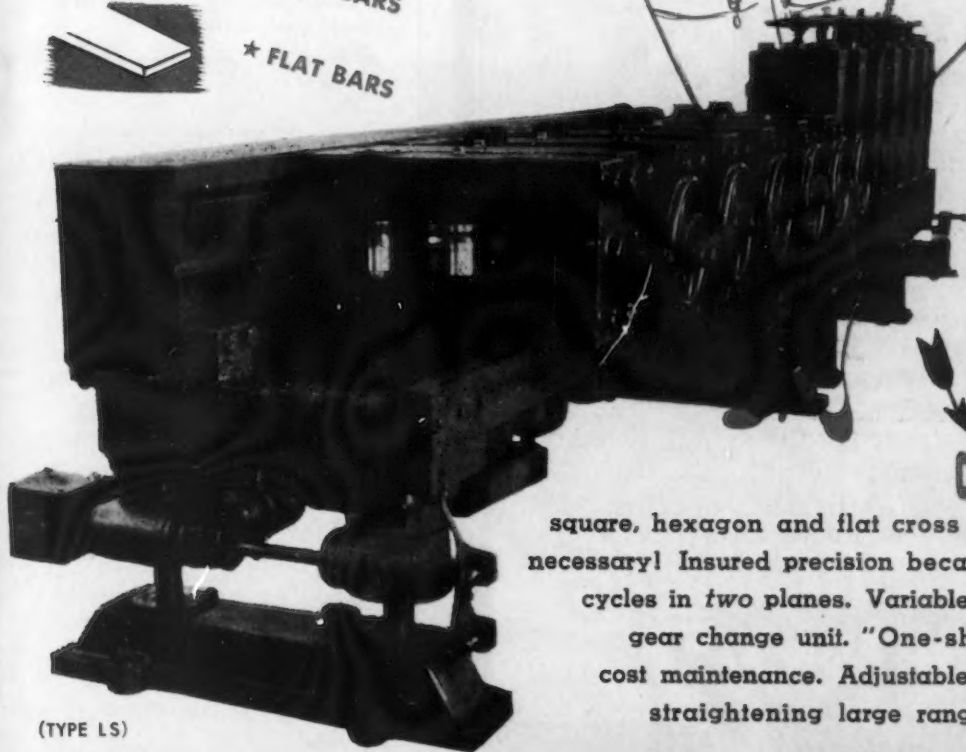
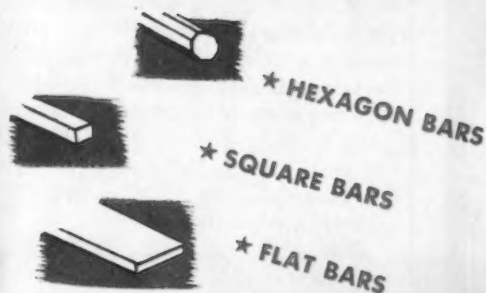
On WPB-652, producers are to list orders for prime plates accepted for shipments during the month reported to a total tonnage, which, together with estimated shipments of mill accumulations, will not exceed 110 per cent of each mill's production directive.

Producers are asked to include in the report and arrange actual production schedules to provide for: (1) Orders carried over for the preceding month. (2) Such orders as the Steel Division may direct you to include. (3) Orders with properly endorsed CMP allotment numbers received prior the closing date for such orders.

If cancellations for deferments are received after the report is submitted the Plate and Shape Section of the WPB Steel Division, should be notified naming the Claimant Agency, customer producing unit and tonnage involved. Form WPB 653 is being revised.

STRAIGHTENS THE MOST DIFFICULT SHAPES!

MEDART'S HIGH PRODUCTION shape straighteners



Combination type rolls handle square, hexagon and flat cross sections . . . no roll changes necessary! Insured precision because of multiple straightening cycles in two planes. Variable speed with 3-speed integral gear change unit. "One-shot" lubrication assures low cost maintenance. Adjustable span between rolls permits straightening large range of sizes on one machine.

Manufacturing Engineers of Complete Transmission Equipment and Specialized Machinery

MEDART

THE MEDART COMPANY
3509 DE KALB ST., ST. LOUIS, MO.

State Labor Laws Bind Massachusetts' Privately-owned Plants

Boston

• • • Massachusetts war factories, rushing to hire high school boys and girls for summer work, find themselves restricted in using such help while government operated plants and farmers are not. The rub is state labor laws. While armories and the like can put boys of 16 on certain machines or may work them after 10 p.m. and more than 48 hr. a week if desired, state laws forbid privately operated plants from doing so.

Boys are trained in trade schools to run such machines as lathes, millers and woodworking devices, but in privately operated plants to be able to operate a so-called hazardous machine they must be 18 or older. Thus boys 16 to 17 years of age must be placed on laborers' jobs or in inspecting or shipping departments.

War plants are steadily forced to give up to armed forces men employees over 17, consequently the need to use boys 16 and 17 on machines is becoming more pressing each day. Management feels that with all machines safeguarded, state laws should be revamped. The question of the 48-hr. week also is a major one. Where a man of draft age is lost he must be replaced by a boy 16 or 17. Where the draftee could work up to 60 hr. a week when necessary, the replacement is held down to 48 hr.

Irrigation Supplies Released

Washington

• • • The War Food Administration last week authorized manufacturers to distribute, without restriction, 100 per cent of their authorized production of irrigation pipe extensions and sprinklers. This action eliminated the 10 per cent reserve previously withheld to provide for meeting emergency situations and removed all restrictions on distribution of rationed irrigation equipment.

In November, when the farm machinery rationing order was issued, manufacturers were authorized to distribute 60 per cent of their authorized production of irrigation equipment. The remaining 40 per cent was withheld as a reserve. Periodically, this reserve was reduced. Last week's action completes the removal of all restrictions.

Salt Brings Back That Will To Work

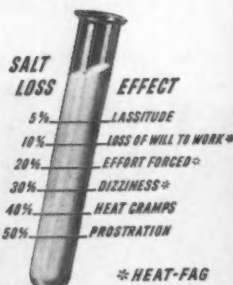
Heat-Fag is an ever-lurking enemy in every shop where toil and sweat are writing new production records. Body salt lost by sweating must be replaced or Heat-Fag sets in. Lowered vitality, fatigue, production slowdowns, accidents and absenteeism can often be laid at the door of this insidious force.

The finger of Accidents is always beckoning to the fatigued, inalert worker. That's why Heat-Fag, ever present when men sweat, takes such a heavy toll in man-hours lost.

Salt tablets restore the body salt lost through sweating. They help keep men alert . . . efficient.

In leading industrial plants, salt tablets are a "must" for men who sweat. They maintain the will to work through long, hard, hot hours.

This Is What Happens
When Sweating Robs
the Body of Salt . . .



MORTON'S
Heat-Fag
SALT TABLETS



Case of 9000, 10-grain Salt Tablets, \$2.60
Salt-Dextrose Tablets case of 9000, \$3.15

Order from your distributor or directly from this advertisement . . . Write for free folder.

Place

MORTON'S DISPENSERS
at all Drinking Fountains.
They deliver salt tablets,
one at a time, quickly,
cleanly — no waste. Sanitary,
easily filled, durable.

500 Tablet size - \$3.25
1000 Tablet size - \$4.00



MORTON SALT COMPANY • CHICAGO, ILLINOIS

Serving and Conserving —

DOING TWO VITAL WAR JOBS . . . RUSTLESS is proud that it has the facilities and the "know-how" to do two war jobs of singular importance.

First, we are producing more Stainless Steels than any other plant in the nation. That is because we are the only plant whose entire resources are devoted to making this one, vital, strategic material and nothing else. Already Stainless Steel's exceptional properties of high tensile strength and remarkable resistance to corrosion by heat, acid and rust have made it a must in the production of the most vital war equipment.

Second, the unique RUSTLESS processes are conserving two metals that are critically scarce. These metals . . . Chromium and electrolytic Nickel . . . are essential, not only for the manufacture of Stainless Steel but for many other war requirements as well. RUSTLESS has largely "by-passed" their use by the discovery of ways to achieve equal results through the use direct in the furnace of ores and through the recovery of stainless steel scrap, both of which are in ample supply.

Thus, RUSTLESS is both *Serving* and *Conserving*; two jobs that we will continue to do with all our might and with all our resources throughout the war and in preparation for the peace to come.



BUY U.S.
WAR BONDS
AND STAMPS



RUSTLESS
CORROSION AND HEAT-RESISTING
STAINLESS STEELS

RUSTLESS IRON AND STEEL CORPORATION • • • BALTIMORE, MARYLAND.

To Help You Plan Now
for the Competitive Days
of **PEACE!**

The Stainless Equipment Your Customers Need Will be Lowered in Cost by the Use of IngAclad Stainless-Clad Steel

When Peace comes, this Borg-Warner Product, proved by more than 10 years in actual service, will again be ready to serve you and your customers, as it is today serving so many wartime needs.

Sharply Reduces Material Cost Yet Gives Perfect Stainless Protection on the Side that is Used!

The contact side of IngAclad is fine quality genuine stainless. The cost is naturally much lower because the stainless cladding of each sheet or plate of IngAclad is bonded to a backing of mild steel approximately 4 times the gauge of the stainless metal. Any given gauge of IngAclad, therefore, reduces by 80% the requirement of vital alloys while giving the finest non-corroding service.

IngAclad is easily fabricated by the same equipment used for mild steel. It meets a wide range of requirements in the Process Industries and is the only Stainless-Clad Steel with a record of more than 10 years in actual service. Our Engineers will be glad to discuss your fabricating problems and to cooperate with you. As producers of both Solid Stainless and Stainless-Clad Steel, we are in a position to recommend the most economical and practical material for any requirement without prejudice and without obligation.

Write for Free Manual on IngAclad Welding Procedure

INGERSOLL STEEL & DISC DIVISION

BORG-WARNER CORPORATION

310 South Michigan Avenue • Chicago, Illinois

Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.

*"A
Borg-Warner
Product"*

INGACLAD
STAINLESS-CLAD STEEL

We Also
Produce
INGERSOLL
Solid Stainless
Steel

New Body Armor For American Flyers

• • • A new body armor, of canvas and steel, for bomber crews of the Army has been developed by Col. Malcolm Grow, surgeon of the U. S. 8th Air Force in England. To protect flyers from missiles of relatively low velocity he determined that a thin steel plate would stop such missiles, including flak.

The armor sheathes the wearer from neck to hips, weighs 20 lb. and can be removed instantly by pulling a release cord threaded through eyes joining two sections along the shoulders. A sleeveless slip-on with transverse pockets, into which plates of steel go, is made of front and rear covers suspended from the shoulders and laced along the sides.

Army Glider Use Seen Enlarged; Big Contracts Let Detroit

• • • Indication of an enlargement in the Army glider program was furnished recently in the announcement of two large Michigan contracts for glider production. A new and larger cargo glider contract was signed by the War Dept. with Ford Motor Co. for approximately \$31,000,000 worth of the units. Production will continue at the Ford wood-working plant at Iron Mountain, Mich.

At Greenville, Mich., the Gibson Refrigerator Co. announced receipt of a \$15,000,000 contract for construction of troop-carrying gliders. The company is now producing similar gliders with wingspread of approximately 84 ft., under contract obtained last year.

Canadian Magnesium Output Increases; Cost Decreases

Ottawa

• • • C. D. Howe, minister of munitions and supply reported that Dominion Magnesium Co. Ltd., Haley's Station near Renfrew, Ont., during the month of March produced an average of 8½ tons of magnesium daily, and frequently attained its rated capacity of 10 tons a day. He stated that the average cost per ton of magnesium produced in March was 39.7 cents per pound compared with 41 cents in the operating period October, 1942, to March 31, 1943. The cost is higher than original estimates, he stated, but will be reduced when the plant is maintaining production at full capacity.

MAKE YOUR OWN TESTS!



**WE KNOW RACO
TYPE D COMPOSITE
ELECTRODES WILL
MAKE GOOD!**

Results most nearly comparable to those obtained with Standard Shielded Arc Electrodes! That's what we claim for Racor Type D Composite Electrodes... and we invite you to make a test on either automatic or manual welding in your own plant.

If you can't get Shielded Arc Electrodes... and you are welding mild steel or galvanized material... by all means, look into the advantages of Racor Type D. Racor Type D is unique... a patented electrode with the flux coating applied to the core wire under tremendous pressure during the wire drawing operation.

There is nothing on the market to compare with it. It is entirely different from washed, dusted or dipped electrodes. AND RACO TYPE D GIVES THE CLOSEST RESULTS TO STANDARD SHIELDED ARC ELECTRODES THAT CAN BE OBTAINED!

WE CAN MAKE PROMPT DELIVERIES OF RACO TYPE D ELECTRODES. SAMPLES OF STANDARD SIZE ELECTRODES WILL BE PROMPTLY FURNISHED ON REQUEST.

PHOTO FROM PRESS ASSOCIATION, INC.

REID-AVERY COMPANY
DUNDALK, BALTIMORE, MARYLAND

Makers of Racor Type HD Shielded Arc Electrodes for Stainless Steel, Mild Steel. Racor Type M and Type D Light Coated Electrodes for Manual and Automatic Work. Samples and Literature on request.

War Jobs Offered to Disabled Service Men

• • • A help-wanted advertisement appearing in the pages of a Hartford, Conn., newspaper aroused much interest among those interested in the welfare and rehabilitation of wounded service men of World War II. The ad, placed by the Gray Mfg. Co., makers of communication equipment, was entitled "A Sincere Message to Disabled and Incapacitated Ex-Service Men." It appealed to the practical rather than sympathetic nature of these men, by pointing out the existing manpower shortage, the importance of the work to be done and the fact that their presence would serve as an inspiration to fellow workers.

No actual employment of disabled men by the company, has taken place to date. About 10 men responded to the ad, but were turned down because of their lack of machine operating knowledge or experience, linked with the fact that their form of disability would be a hindrance to their work. Officials believe, however, that most casualties returning to the area have not yet recovered sufficiently to go into industry, but that in the near future the response will be greater and the possibility of employing more men better.

The company has received comments from all over the United States from people who are interested in this program to absorb disabled ex-service men into industry. The War Manpower Commission, under the signature of Arthur V. Geary offered the concern the complete cooperation and assistance of the Veterans' Employment Service of the USES in Connecticut as well as the assistance of the Occupational Adjustment Service. In reply to Rep. Miller of Connecticut who proposed to President Roosevelt that a survey be made of all government positions with the aim of finding employment opportunities for these men, the President said "Employers are modifying their views on the full usefulness of the handicapped. The truth is that if placed in positions for which they are really fitted, men with many forms of disability will prove not only equal to but often superior to others in both quality and quantity of work done."

The company has encouraged other concerns to make use of the same idea or advertisement, for it is believed that many industrialists feel that this program is a long step in the right direction. As casualties mount in the near future, inquiries for jobs will, no doubt, mount too.



A Pledge from AMPCO Employees

The Men and Women of Ampco Metal, Inc. feel honored in having received the Army-Navy "E" We take this to mean that we have not failed to keep the faith with the men in uniform.

Since nothing has been done that cannot be done better, we pledge that in the months to come, our minds, hearts and muscles will be devoted to the production of still more of the finest materials. Certainly our very best is the very least our fighting men deserve. We will back them every step of the way to final VICTORY!

Duke Ruppenthal
President

EMPLOYEES MUTUAL BENEFIT ASSOCIATION
OF AMPCO METAL, INC.

AMPCO METAL, INC., MILWAUKEE, WISCONSIN

AMPCO METAL



THE METAL WITHOUT AN EQUAL

NOW MORE IMPORTANT THAN EVER BEFORE...

Speed plus Safety!

You get both in a Macwhyte Atlas Braided Wire Rope Sling



ADD THESE, too...

- Light-weight, flexible, easy to handle
- Positively NON-SPINNING
- Kink-Resistant
- Patented construction of LEFT-&-RIGHT LAY ropes
- Non-damaging to loads
- Store in small space
- No splices to wicker
- Terminate in natural loop-ends
- L-O-W final cost

Yes, this sling body is responsible for ALL these advantages.

See how the wire ropes are spirally woven? (See illustration below.) Notice how uniform the braided body is? Two endless wire ropes, one left-lay construction and one right-lay construction, are woven in a uniform spiral throughout the length of the sling. No other sling is made like this one. The result is a lifting element of unmatched strength and flexibility.

Today, Macwhyte Atlas Slings are safely speeding production of countless guns, tanks, engines, ship sections, and hundreds of equally vital war materials. They can help you, too. Write on your company letterhead for complete

story. Address Macwhyte Company, 2911 Fourteenth Avenue, Kenosha, Wisconsin.

CONSULT WITH US—SAVE TIME, DELAY

Time is vital. Help save yours by taking advantage of our sling experience. You know what work you want the slings to do; we can tell you, from years of experience, the sling design best suited for that job.

Before taking time to design the sling yourself, why not consult with our engineers? They can simplify the sling equipment needed, make every inch of steel give MAXIMUM service. That's what YOU want. That's what YOUR COUNTRY asks.

Time and materials are vital. On sling problems, consult Macwhyte. Save both time and materials.

NO. 665-B

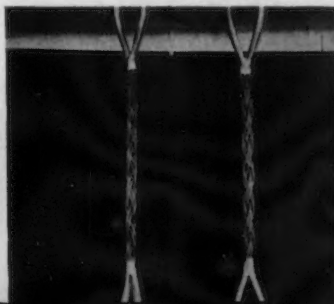


Left-Lay Ropes are woven in a right-hand (lay) spiral.

Right-Lay Ropes are woven in a left-hand (lay) spiral.

Thus we have a sling body made from opposite lay ropes which are woven in a direction contrary to the lay of the rope itself.

This is what makes Atlas Slings so flexible. This is what gives you Speed Plus Safety.



S-P-E-E-D plus Safety

MACWHYTE ATLAS

Braided Wire Rope SLINGS

"The sling with the perfectly balanced body"

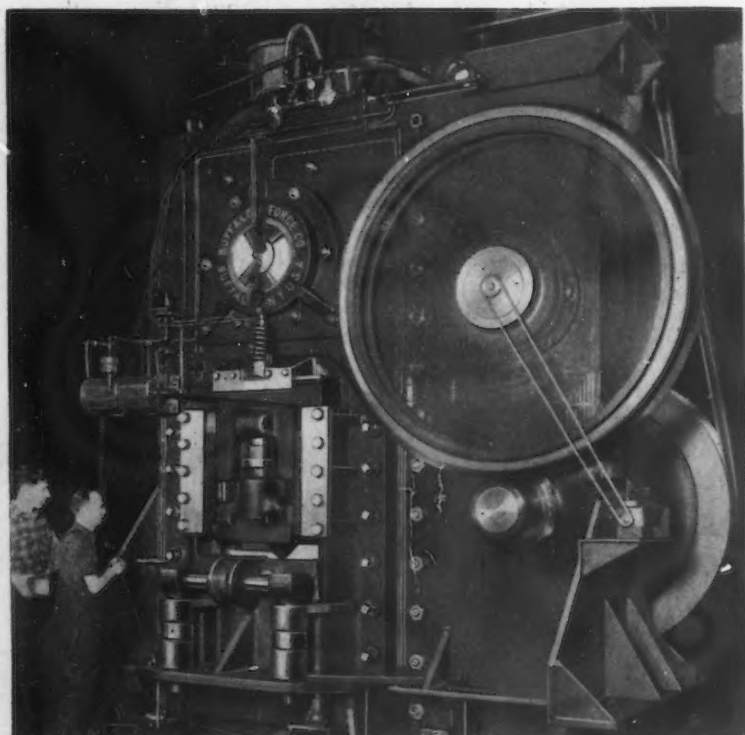


MACWHYTE COMPANY, 2911 Fourteenth Avenue, Kenosha, Wisconsin
Manufacturers of wire rope to meet every need—Left-&-Right Lay Braided Slings—Aircraft Cable, Aircraft Tie-Rods, and "Safe-Lock" Swaged Terminals.
Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle
San Francisco. Distributors throughout the U. S. A.



*They can
"pass the ammunition"
...faster*

Thanks to the Billet Cutting Speed
of this "Buffalo" Shear



THE knives of this giant shear, with a 3½ million pound cutting power, deliver eight husky chunks of alloy steel billet every minute—and set them on their way to be machined into Victory shells. It's a tough assignment, sure, operating on a 24-hour a day shift—yet

the massive construction and simplicity of operation of Buffalo Billet Shears makes easy, accurate work of it. Here's just another Buffalo contribution that enables our Fighting Forces to "pass the ammunition faster". Engineering details are yours in Bulletin 3295.



BUFFALO FORGE COMPANY

492 Broadway

Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

BILLET SHEARS

Trade Notes

Lycorning Division of Aviation Corp., Williamsport, Pa., has expanded its facilities by the addition of a \$500,000 plant.

McCulloch Engineering Co., Milwaukee, has been purchased by Borg-Warner Corp., Chicago, and will be operated as a subsidiary plant with Robert P. McCulloch as president.

Meehanite Metal Corp., New Rochelle, N. Y., announces that the John Hastie & Co., Ltd., Greenock, England, is now manufacturing Meehanite Castings.

Service Caster & Truck Co., Albion, Mich., has been acquired by Domestic Industries, Inc., Chicago. The Service subsidiary, Service Truck & Caster Co. of New England, Somerville, Mass., was included in the acquisition.

Cochrane Corp., Philadelphia, has appointed Bushnell Controls & Equipment Co., Los Angeles, to handle direct sales of Cochrane flow meters in California, western Nevada and Arizona. Metrol Co., Detroit, has been appointed to handle flow meter sales for the Detroit territory.

H. K. Ferguson Co., Cleveland, has started construction on a detinning plant at Birmingham, Ala. The plant will be government financed.

McKenna Metals Co., Latrobe, Pa., has taken over the direct sales, engineering, and service of Grayson-Kennametal milling cutters.

General Motors Corp. announced that effective July 1 the Sunlight Electrical and Packard Electric Divisions at Warren, Ohio, will be combined and known as Packard Electric Division. B. N. MacGregor will be general manager of the new division, and J. E. Estabrook will be his special assistant.

Kellett Autogiro Corp. will reassume the name of Kellett Aircraft Corp. which was the original company name when it was founded in 1929.

Heidrich Tool & Die Corp.'s new address is 2441 Bellevue at Vernor, Detroit.

Fred W. Wappat, manufacturer of portable electric hand saws, has built a new plant at Mayville, N. Y.

A. P. de Sanno & Son, Inc., Phoenixville, Pa., recently announced the opening of Philadelphia offices for the machine sales division and export department.

Lindsay & Lindsay, 22 West Adams Street, Chicago, announce the purchase of a new plant located at 4818-4833 South Rockwell Street, Chicago.

Doughboy Machines, Inc., has been organized at New Richmond, Wis., to manufacture machinery and appliances. E. J. Cashman is head of the company.

Wood, Nathan & Virkus Co., Inc., Racine, Wis., has moved into larger quarters in the former Racine Universal Motors building at 1637 Gould Street.

Wells Mfg. Co., Fond du Lac, Wis., has received approval from the WPB for an addition to its present plant for increased manufacturing facilities.

What "Certified" Means to You

IN SMITHWAY WELDING ELECTRODES



☆ Every step in the manufacture of SMITHway Certified Welding Electrodes, from raw materials to concentricity and brushing, is subject to rigid shop and laboratory control, unparalleled in the electrode manufacturing business. Our reasons for going to this extra expense are twofold.

First, we have *proved* in our own welding shops that the *time* and *material* costs of welding are governed by the number of *good* welds per hour—not by the price per pound of the electrodes.

Second, the number of *good* welds per hour depends, first, last, and always, on the *quality* of the electrodes and how well their *characteristics* fit

the requirements of the job. When the electrodes which provide the most desirable characteristics have been found, it is very important that these characteristics be duplicated in subsequent orders.

The serial number on each box of SMITHway Certified Welding Electrodes is the A. O. Smith Corporation's guarantee that the electrodes in that box are *identical* in quality, and in characteristics to previous shipments of that type of electrode. Smith certification, therefore, is your assurance that the price you pay for SMITHway Certified Welding Electrodes buys considerably *lower* welding costs—and considerably *better* welding results.

Mild Steel . . . High Tensile . . . and Stainless Steel WELDING ELECTRODES

Made by welders . . . for welders

SMITHway Welding Monitor: cuts training time 33 1/3%.

SMITHway AC Welding Machine: more good welds per man-hour.



A.O. SMITH Corporation

MILWAUKEE • WISCONSIN • HOUSTON • TEXAS



NON-FLAMMABLE
Safe...Easy to use
ECONOMICAL

NON-SKID...
Removes danger
of accidents
from slipping,
preventing loss
of man hours
and possible
lawsuits



FIRE-SAFE
Compounded
entirely of non-
burnable ma-
terials

Whisk away messy, hazardous oil and grease deposits with lightning-fast CAREY Asbestos Sweeping Compound. So quick, so thorough, so easy to use—it's like MAGIC!

CAREY Asbestos Sweeping Compound is an improved, efficient, inexpensive, fire-safe compound for sweeping up oil and grease. It is the ONLY product of its kind which has been given the "Class I, Non-Combustible" rating by Underwriters' Laboratories, Inc. Highly absorptive and mildly abrasive. Used dry; nothing to add. Non-skid—lessens danger of accidents from slipping. Harmless to floors, hands, shoes, and clothing. Economical—use over and over until fully saturated.

This compound is excellent for soaking up acids around pickling vats, storage battery spillage, cleaning solutions, etc.

Play SAFE . . . get RESULTS . . . with CAREY Asbestos Sweeping Compound. Prompt shipments in 50-lb. bags from 45 branch warehouses. Free trial will furnish convincing proof. Samples and full information on request. Write Dept. 26.

CAREY Asbestos Sweeping Compound falls in "Class I, Non-Combustible"—according to the Standard of Underwriters' Laboratories, Inc., for the classifications of Sweeping Compounds, in which Class I includes "Noncombustibles"; Class 2 "Nonflammables"; and Class 3, "Slow-Burning Mixtures."

THE PHILIP CAREY MFG. CO. LOCKLAND, CINCINNATI, OHIO

Dependable Products Since 1873

In Canada: The Philip Carey Company, Ltd. Office and Factory: Lennoxville, P. Q.



Fewer Vacations Seen

New York

• • • Fewer wage earners and salaried employees will have vacations this year, and proportionately more will receive pay allowances in lieu of time off, than in 1942, according to the National Industrial Conference Board.

Among 148 companies, 62, or slightly less than 42 per cent, paid vacation allowances in lieu of actual time off to some or all of their wage earners in 1942. Seventy-three, or 49.4 per cent, now report that they will, or probably will, do so this year. Thirty-three of 150 companies, or 22 per cent, reported that they paid allowance in lieu of vacations to a part or all of their salaried employees last year. Forty-three, or 28.7 per cent, of these same companies now advise that they will, or probably will, do so this year.

American Institute of Bolt, Nut and Rivet Manufacturers has established a special department known as the Aircraft Fasteners Division to cooperate with manufacturers of fasteners for aircraft. The committee establishing the division consisted of: H. O. McCully, Russell, Burdall & Ward B & N Co.; J. W. Fribley, Cleveland Cap Screw Co.; A. M. Jones, Buffalo Bolt Co., and C. F. Newpher, National Screw & Mfg. Co.

Irving S. Olds, chairman of the Board of Directors of United States Steel Corp., was elected a trustee of Cooper Union for the Advancement of Science and Art. Mr. Olds succeeds the late J. P. Morgan.

Thomas D. Jolly, vice-president in charge of engineering and purchasing of the Aluminum Co. of America, received the J. Shipman Gold Medal at the annual convention of the National Association of Purchasing Agents.

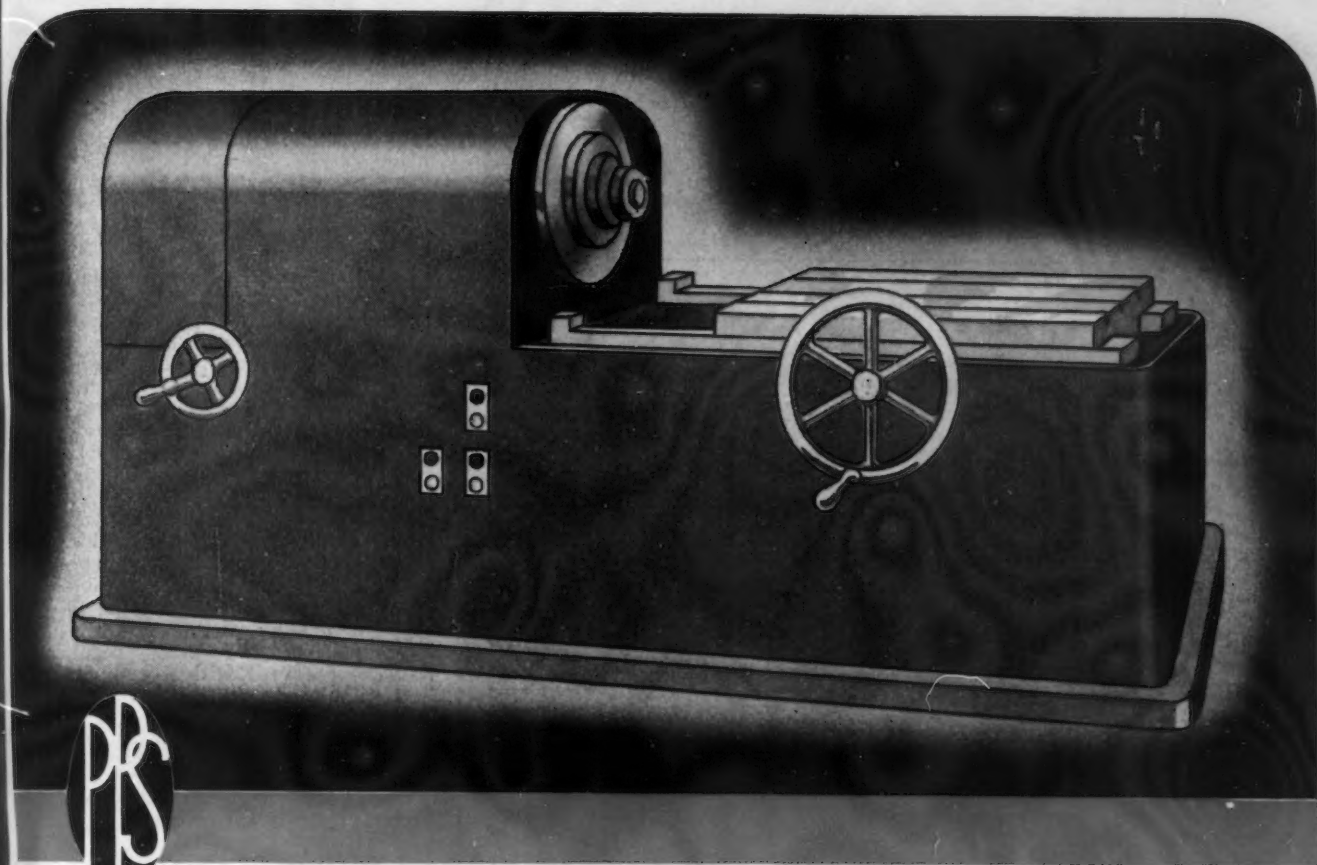
General Refractories Co., Philadelphia, has purchased the assets of the Refractories Corp. of Los Angeles. From now on it will be operated as a unit of the General Refractories Co.

Detroit Electronic Laboratory, 10345 Linwood Ave., Detroit, recently formed, will concentrate on the development and manufacture of special purpose electronic tubes. John D. Gordon, formerly general manager of Taylor-Winfield Corp., is general manager.

Widmeyer Bearing Co., Inc., 789 North Milwaukee St., Milwaukee, has changed its name to Bearings, Inc.

Rubber Manufacturers' Association has taken over the Hannahs Mfg. Co., Kenosha, Wis., for processing rubber tires purchased from private owners and now the property of the government.

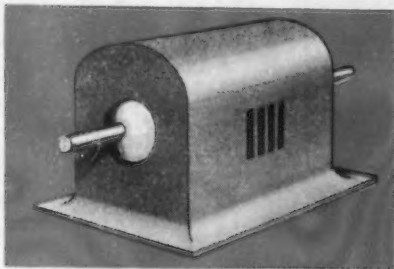
Inter-State Tool & Mfg. Co. has been organized with offices at 212 W. Wisconsin Ave., Milwaukee, by Charles W. Zirbel, Charles W. Stephen and Julius Zielke.



PARTS FOR FACTORY EQUIPMENT & MACHINERY

Advances in engineering and design and improved materials will make "The work shop of the world" a new vision of utilitarian beauty.

Pressed Metal Parts and stampings will be used for factory equipment and machinery in the future, just as they have been in the past, but to an accelerated degree. They will make possible revolutionary advances, due to their ability to stand up to abuse, resistance to shock, rugged strength, ability to withstand corrosive conditions, survive radical temperature changes, not to mention low cost and a score of other characteristics, providing requirements not met by any other material.



Sound safe designs literally demand fullest possible use of stampings. Call on the Parish Pressed Steel Company for engineering cooperation. Our services will be found helpful.



★ METAL STAMPINGS ★ MODERN DESIGN AT LOW COST ★

PARISH PRESSED STEEL CO. *Subsidiary of* **SPICER MFG. CORP.**
READING, PA.

Western Representative: F. Somers Peterson, 57 California St., San Francisco, Cal.



Good chain

—ready for hard work

Pass this word to your men—BEFORE HOOKING UP A CHAIN STRAIGHTEN IT OUT, CLEAR IT FOR ACTION. • Many new men don't know this should be done. • It's easy to handle chain the right way. Right handling results in better performance, longer life, and, above all, safety. • Treat chain right if you want to get the most work out of it, and reduce breakdowns, delays and accidents.

AMERICAN CHAIN DIVISION

York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT, CONNECTICUT



Iron Printing Plates Developed at Battelle

• • • Electrolytic iron may become a metal of major importance in the printing industry should governmental restrictions on the use of war-scarce copper and nickel become too severe, research metallurgists of Battelle Memorial Institute, Columbus, indicated recently in a report of their experiments with substitute materials for the production of printers' electrotypes and stereotypes.

In attempting to adapt iron electrodeposition to the making of electrotypes and stereotypes, Battelle technologists sought to overcome the brittleness of deposit, peeling, pitting, and other difficulties. Satisfactory results were obtained with a combination sulphate-chloride bath.

Pennsylvania Changes Unemployment Pay Law

Harrisburg, Pa.

• • • Unemployed workers claiming compensation in Pennsylvania now are confronted with five basic changes in the state unemployment compensation law.

In addition to establishing experience rating as a job stabilization feature in the state job insurance program effective next January, the General Assembly fixed the period June 1 to May 31 as the benefit year for all claimants registering after June 1 under the old provisions of the law until expiration of such benefit year.

There is no change in the minimum and maximum weekly benefit amounts. The method of computation, however, is "streamlined" so that now the compensation amount is computed on four-quarter earnings rather than on the previous eight-quarter formula. The full-time weekly wage is dropped. The weekly benefit rate is now computed at four per cent of high quarter earnings.

The amendment changes the word "fraud" to "fault" thereby permitting the bureau to execute further recoveries in cases of misrepresentation.

In anticipation of federal payments to idle demobilized service men, the Pennsylvania law would require such veterans to exhaust their federal benefits before establishing eligibility under the state program.

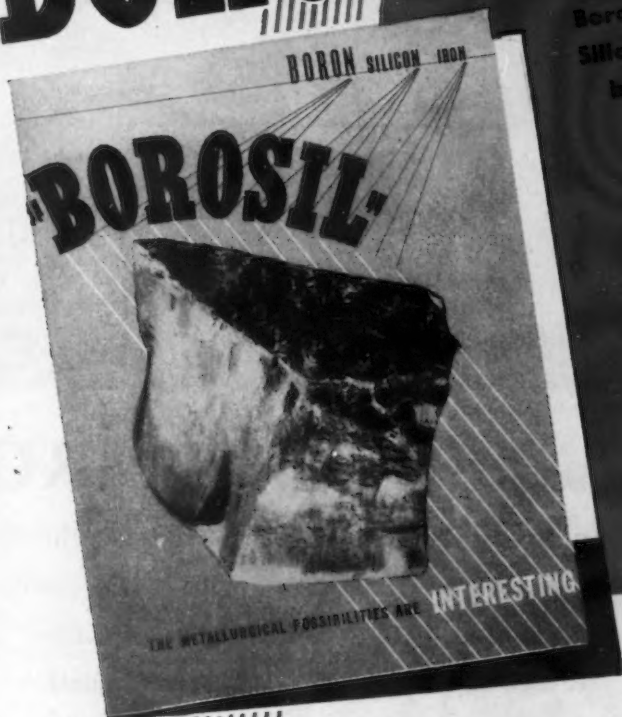
Simanal

Silicon 20%,
Manganese 20%,
Aluminum 20%,
balance Iron



BOROSIL

Boron 3 to 4%,
Silicon 40 to 45%,
balance Iron

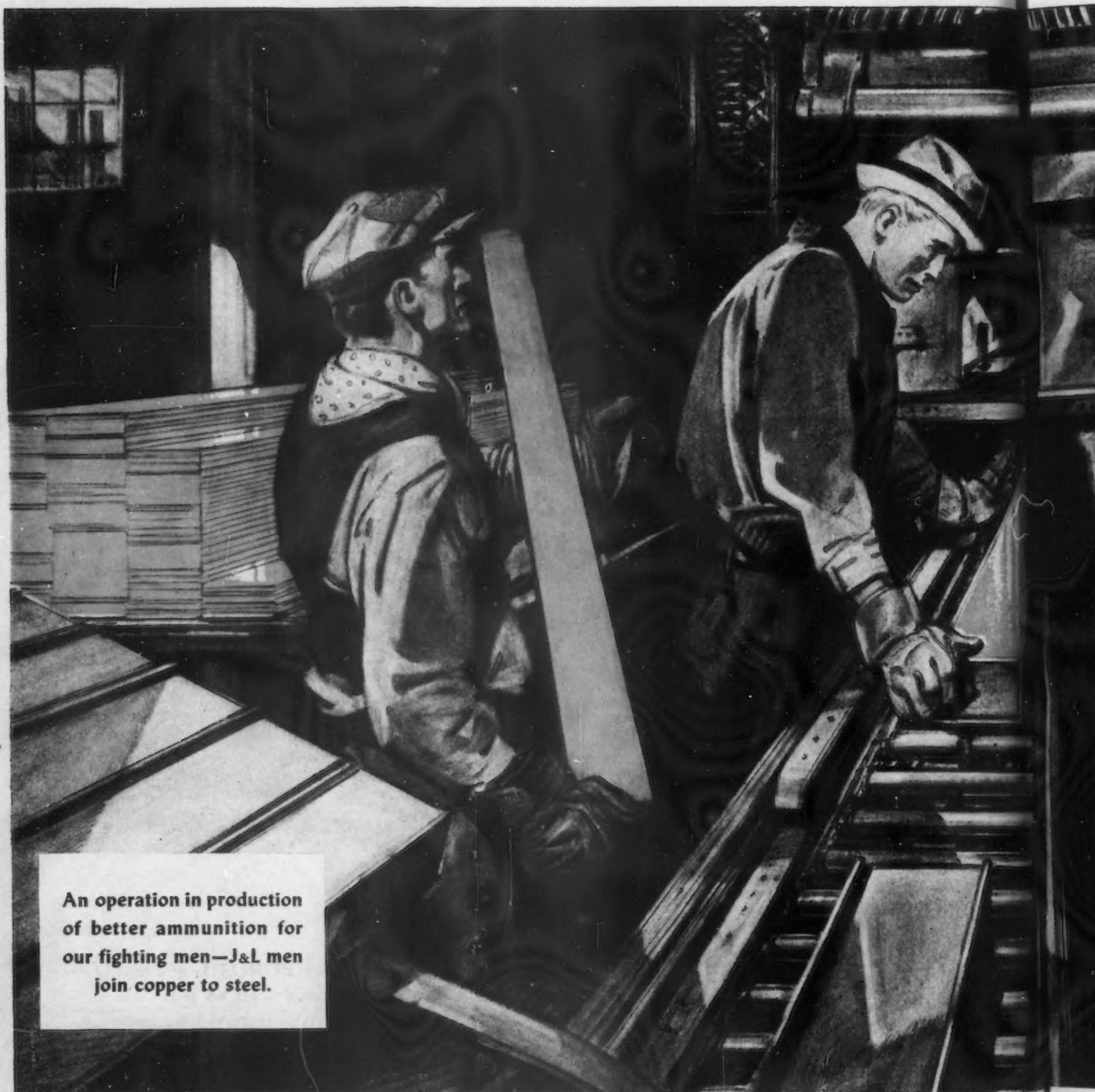


SIMANAL and BOROSIL are modern ferro-alloys produced to formula under close control—providing remarkable advantages in steel manufacture. Their characteristics are described in folders which are available upon request, without obligation.



Ohio Ferro-Alloys Corporation
Canton, Ohio

CHICAGO • DETROIT • PITTSBURGH • TACOMA



An operation in production of better ammunition for our fighting men—J&L men join copper to steel.

COPYRIGHT 1943—JONES & LAUGHLIN STEEL CORPORATION

NEW-TYPE BULLET JACKETS FROM D

Teamwork on the production front as well as on the fighting front is vitally essential to winning the war. An example of war-production teamwork is the manufacture, for the first time, of copper-saving bullet jackets with a steel base.

One company, Superior Steel, developed the method for producing half-mile long ribbons of steel veneered with tissue-thin copper. Jones & Laughlin

made its contribution by developing the squat H-section bars of steel so essential in the operation.

These bars are being rolled on the unique J&L 14-inch mill in thousand ton lots while another unit peens the outside plies of copper to the bars, and still another department, utilizing equipment ingeniously converted from peace-time strip production, rolls and reduces the wedded metals into glistening



FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

INDUSTRIAL TEAMWORK

copper-surfaced strip. Then, a third company, National Can, cuts discs from the strip and forms them into thimble-like cups. A Government arsenal then shapes the cups into bullet jackets — steel jackets that are veneered with copper inside as well as outside — deadly in their impact on the enemy.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH, PENNSYLVANIA
CONTROLLED QUALITY STEEL FOR WAR



FAST FREIGHTS

"Red Fox" is the name of a northbound fast freight train of the Seaboard Airlines, operating daily from Miami to Richmond. American railroaders have names for their crack freight trains as picturesque as names of passenger trains that are favorites with traveling public. "The Migrator" is the southbound counterpart of the Red Fox. Other Seaboard "name" trains are "Iron Master," Birmingham to Richmond, and "The Capital" southbound. There are two famous "Round Ups" in the service; the New Haven's fast freight running both directions between Harlem River and Boston, and the Chicago and Northwestern's westbound freight from Proviso (Chicago yards) to Council Bluffs. An eastbound freight with a western name is the Pennsylvania's "Ranchman" daily from East St. Louis to Enola, Pa., (Harrisburg yards).

Double feature freight, since it is operated jointly and in both directions by the Pennsylvania and the New Haven, is the daily "Speed Witch" between Baltimore and Boston. "Komet" is fastest evening freight of the Missouri-Kansas-Texas from St. Louis and Kansas City through to Galveston. "Bullet" is another evening train. "Klipper" is afternoon freight from St. Louis to Dallas and Fort Worth. Other picturesque fast freights are the New Haven's "Main Bullet" and "Cannon Ball"; the Pennsylvania's "Meteor," "Comet" and "Yankee," operating westbound from Harrisburg to Cleveland, to St. Louis and to Chicago, the "Flying Cloud" from Buffalo to Pittsburgh; the "North Star" Pittsburgh to Buffalo, "Man O'War," and "Eagle" eastbound out of Cleveland, and Chicago; the Northwestern's "Rocket," "Calumet," "Mohawk" and "Chief."

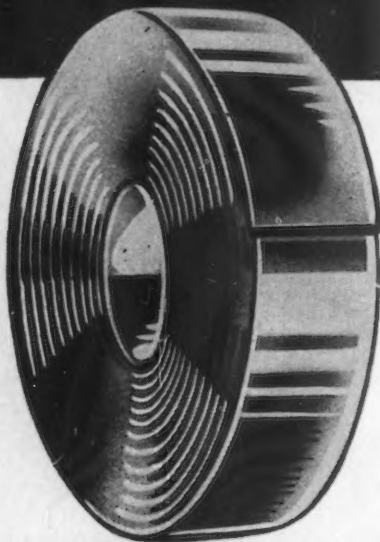
Mile of boiler tubing, made of finest grade steel, is required for average locomotive.

Cushioned with copper, a comparatively soft metal, bullet jackets protect and preserve the rifling in gun barrels, thus enabling longer use of the weapon for accurate shooting—invaluable in war time. Rifling imparts rotary motion to projectile, insuring greater accuracy of fire.

"To **peen**" says the dictionary "is to stretch or bend metal by indentation" (note use of word in text of advertisement). The hemispherical end of the familiar metal worker's hammer, opposite the face, is called a peen.

Soldiers were paid in tobacco in Maryland according to an Act of Assembly of April 26, 1758, "Ordering and Regulating the Militia of this Province." Colonels of foot were paid 2,000 lbs. of tobacco per month, Colonels of horse, 2,300 lbs. Lieut. Cpls. of foot, 1,500 lbs.; of horse, 1,800 lbs. and so on down the lines to foot soldiers, 300 lbs. of tobacco per month, troopers (never referred to in the Act as cavalry) 600 lbs.

SUPERIOR



**HOT and
COLD ROLLED
STRIP STEEL**

**Carbon-Alloy
STAINLESS
and
SuVeneer Clad Metal**

**SUPERIOR
STEEL CORPORATION
CARNEGIE, PENNA.**

NEWS OF INDUSTRY

OPA Issues New Price Interpretations

••• OPA has issued a new series of price interpretations. The following material is official OPA text.

Price Schedule No. 49

Resale of Iron or Steel Products

PRICE DETERMINATION

Tinplate resulting from processing of used tin cans. A maximum price of \$100 per net ton at location, for tinplate resulting from the processing of used tin cans is permissible where the sale is to a detinner or bottler by a warehouseman, or jobber, or any other person other than the original processor; the General Maximum Price Regulation applies where the sale of such tinplate is made by the original processor of used tin cans.

Shipments in carload quantities—40,000 lb., order shipped in smaller quantities. Section 1306.159 (k) (5) is applicable to an order in excess of 40,000 lb., even though the order is shipped in smaller quantities.

Maximum Price Regulation No. 230

Reusable Iron and Steel Pipe

APPLICABILITY

"Delivery" before effective date of Regulation. Where pursuant to the terms of sale, the seller of reusable iron and steel pipe agrees to hold the pipe sold at the risk of the purchaser, and prior to October 3, 1942, the pipe is segregated, identified and earmarked for the account of the buyer, and the risk of loss has passed from the seller to the buyer and the buyer is to deliver the pipe by his own carrier, the sale and delivery have been completed prior to October 3, 1942.

PRICE DETERMINATION

Oil country tubular goods—use by purchaser. The maximum prices set forth in Section 1306.466 (d), Table II, are applicable to oil country tubular goods suitable for reuse for

the purpose for which such pipe of prime quality is customarily used, regardless of the actual use to which the pipe will be put.

Maximum Price Regulation No. 241

Malleable Iron Castings

APPLICABILITY

Sellers affected. The Regulation applies to sellers of malleable iron castings at all distribution levels, including producers and wholesale distributors.

Price Schedule No. 6 Iron and Steel Products

PRICE DETERMINATION

Federal transportation tax—carbon steel plates. Under Supplementary Order No. 31—Tax on Transportation of Property Imposed by Revenue Act of 1942, the 3% tax on freight bills is treated by OPA as an increase in freight. Therefore, in determining the maximum price of carbon steel plates, a producer may add the 3% Federal transportation tax on the freight from the governing basing point to Detroit. The maximum prices for carbon steel plates are the basing point prices at the governing basing point, plus transportation charges from such point to Detroit, there being no arbitrary delivered prices at Detroit for such plates.

Price Schedule No. 49

Resale of Iron or Steel Products

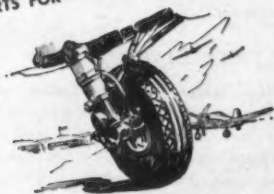
APPLICABILITY

Sales by shipyards to other than a consumer. Sales by shipyards of reusable steel plate to a dealer or any other person other than a consumer, continue to be subject to Schedule No. 49 after February 1, 1943, the effective date of Regulation No. 310 (Reusable Structural Steel Shapes and Plates, and Shafting). Regulation No. 310 applies

UNLUCKY FOR AXIS: Thirteen will be an unlucky number for the Axis as long as the Prehoda family is on the job. All thirteen shown in the picture are busy at war jobs in the East Pittsburgh Works of the Westinghouse Electric & Mfg. Co.

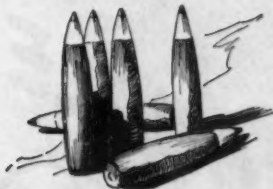


PARTS FOR — AIRCRAFT



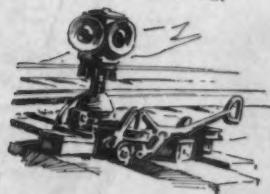
Tail wheel assemblies, actuating cylinders and engine forgings. Brake lining. Camshaft and starter bearings.

PARTS FOR — BATTLE



Shell and shot forgings. Cast bomb parts. Steel armor plate castings. Ammunition hoists. Torpedo parts.

PARTS FOR — TRACKWORK



Crossings, switch stands, switch point locks, guard rails, rail lubricators. Trackwork for industrial equipment.

You Name the Part —

PROBABLY WE MAKE IT

Brake Shoe MAKES PARTS for original equipment and for maintenance; parts that are upset and drop forged; molded fabrics and plastics; ferrous and non-ferrous castings. In war, as in peace, Brake Shoe ships millions of parts to thousands of manufacturers, in many fields of industry.

The services of our research and development engineers are available for immediate or post-war problems.

AMERICAN BRAKE SHOE COMPANY, 230 PARK AVENUE, NEW YORK, N. Y.

AMERICAN

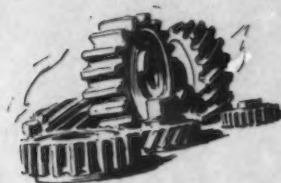
Brake Shoe

COMPANY

58 PLANTS SERVING INDUSTRY AND TRANSPORTATION

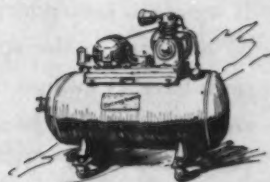
American Brakeblok Division	Detroit, Mich.
Ramapo Ajax Division	New York City
American Manganese Steel Division	Chicago Heights, Ill.
Brake Shoe and Castings Division	New York City
Kellogg Division	Rochester, N. Y.
American Forge Division	Chicago, Ill.
Southern Wheel Division	New York City
National Bearing Metals Corp.	St. Louis, Mo.

PARTS FOR — MANUFACTURERS



Manganese steel chain, gears, sheaves, sprockets and wheels. Hard surfacing welding rods. Forgings, castings.

PARTS FOR — GARAGES



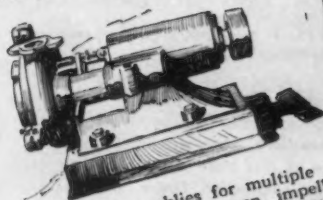
Air compressors. Car washers. Brake lining, fan belts, clutch facing, radiator hose, auto lifts.

PARTS FOR — SHIPS



Strut and stern tube bearings. Carbon steel castings for davits and winches. Bronze castings for engines.

INDUSTRIAL PUMPS

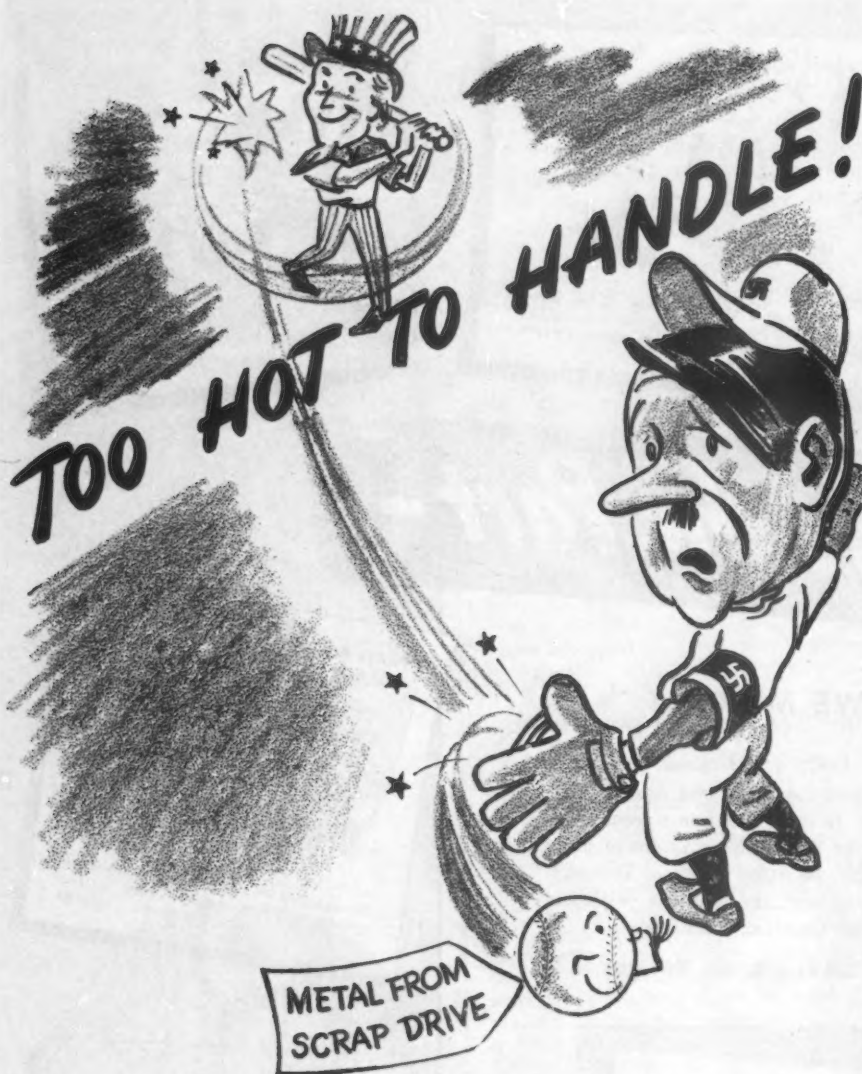


Complete assemblies for multiple or two van closed or open impeller type. Single stage self-priming pumps.

PARTS FOR — WELDING



Welding rods, flux, nickel-manganese filler, applicator bars. Welding products for repair of ferrous equipment.



If we are to keep pouring hot lead into the Axis, there must be no letup in the scrap metal salvage drive. The mills must have 45 million tons of scrap this year to produce the steel required in 1943. This means practically continuous peak production. To do it everyone must salvage scrap because regular sources of supply are insufficient. There's still plenty of scrap around the factories, farms, garages, and homes of the country, waiting to be put to work. Dig it up and sell it to a junk dealer who will send it to the mills for processing. Don't wait—the need is urgent—the mills must have a continuous flow of extra scrap.



The mills are asked to produce 90 million tons of steel in 1943. Every ton of steel takes 1000 pounds of scrap metal. Are you doing your share in the scrap metal salvage drive?



DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

only to sales to a "consumer" as defined by that regulation.

PRICE DETERMINATION

Warehouse sales—transportation charges. Where the less-than-truckload rate is higher than the less-than-carload rate and a customer insists upon shipment by truck, the warehouse may charge him the difference between the rail and the truck rate. If, however, shipment is made by truck for the convenience of the warehouse, the warehouse may not charge higher than the rail rate.

Were less-than-carload shipments must now be handled at the higher rate for railroad pick-up and delivery service, the additional cost of delivery must be absorbed by the warehouse out of its margin.

Price Schedule No. 1

Second-Hand Machine Tools

PRICE DETERMINATION

Loading charges. Where a second-hand machine tool is sold "as is where is" at the maximum price for the machine, the cost of loading must be paid by the seller and may not be added to the maximum price of the machine tool.

RECORDS AND REPORTS

Leased machine tools. Where second-hand machine tools were leased prior to March 15, 1941, such tools were not "in stock" on that date, within the meaning of Section 1301.2 (b), and therefore, during the period of the lease, it was not necessary to file the inventory reports required by that section. However, upon the termination of the lease, the machines covered thereby are "added to stock" within the meaning of Section 1301.2 (b), and it is necessary to file the inventory reports required by that section.

VIOLATIONS AND EVASIONS

Auctions—sale by winning bidder of his right to buy. The winning bidder at an auction, bid the maximum price for a second-hand machine tool and sold his right to buy the machine to A. This is a violation of Schedule No. 1 by both the bidder and A.

Price Schedule No. 67

New Machine Tools

APPLICABILITY—DEFINITIONS

"Extra." An "extra," as defined in Section 1301.58 (i), is equipment which has three components: (a) designed for use on or with a machine tool, are determined as of March, 1942. Turned or shaped wood products which were customarily sold at the same markup, because of the nature of manufacture, volume of production or methods of sale during March, 1942, are "products of the same class."

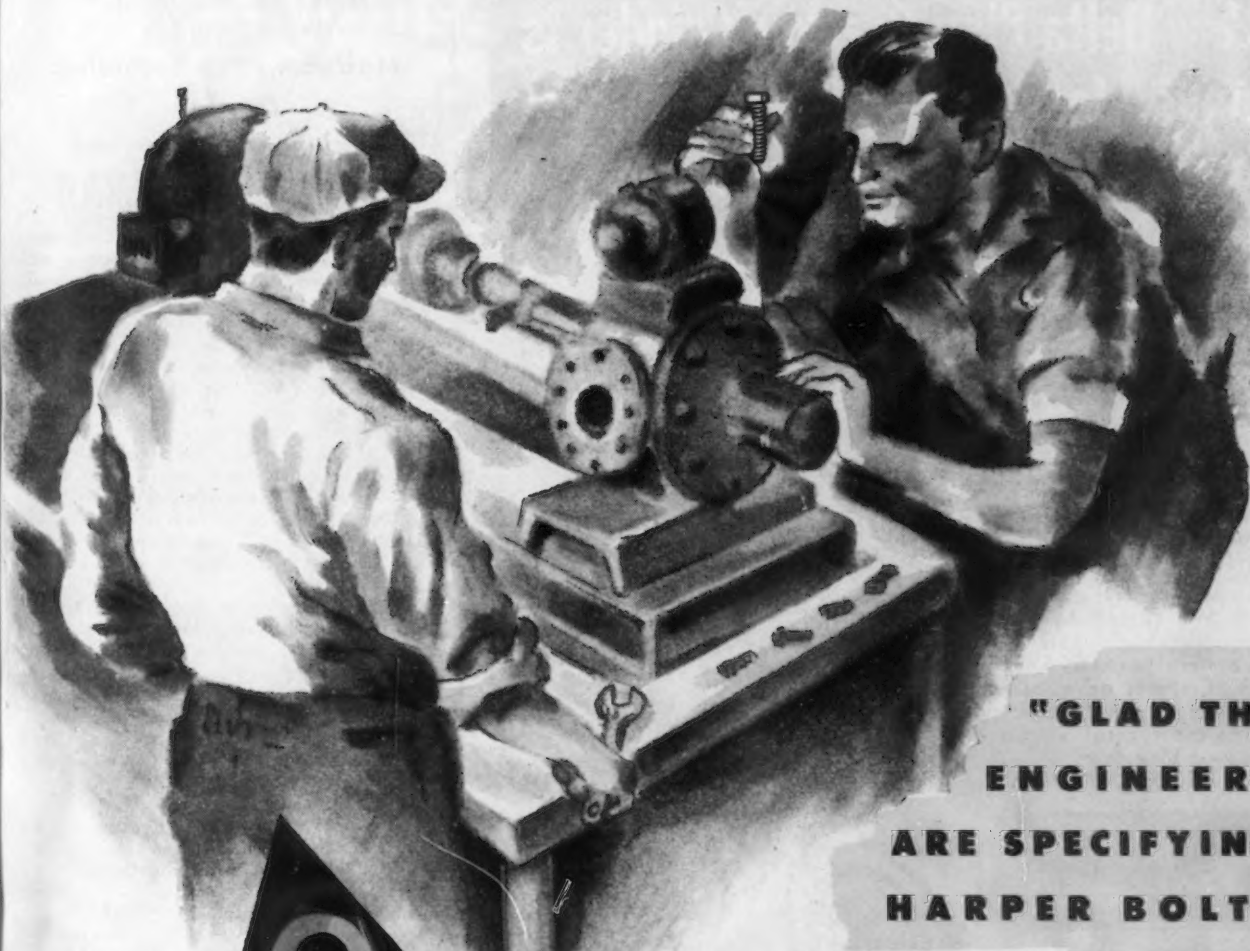
PRICE DETERMINATION

Machine tool unpainted pursuant to WPB Limitation Order. Under Limitation Order L-108, a manufacturer of milling machines is restricted from painting metal equipment except as stated in the Order.

Question: May a person receiving a machine at this time with the finish as specified in the Limitation Order, pay the same price for this machine as he would have paid for the same machine with the better finish before the Limitation Order?

Answer: Yes.

(CONTINUED ON PAGE 118)



**"GLAD THE
ENGINEERS
ARE SPECIFYING
HARPER BOLTS**

"Harper Bolts don't rust. They're tough and they'll make this pump last a lot longer."

Yes . . . the non-ferrous and stainless fastenings made by Harper are adding extra toughness and extra service-life to vital parts of ships, tanks, jeeps, planes and other war equipment. Also in hundreds of war production jobs they are preventing failures of vital equipment and keeping production rolling. They have high tensile strength; they resist rust, corrosion, many acids and alkalies and other tough conditions.

4320 STOCK ITEMS . . . of bolts, nuts, screws, washers, rivets and accessories in the non-ferrous and stainless alloys.

WRITE FOR CATALOG . . . and reference book—80 pages—4 colors—193 illustrations—numerous tables and other data. Free when requested on a company letterhead.

The H. M. HARPER COMPANY
2607 Fletcher Street, Chicago
EASTERN BRANCH: 45 West Broadway, New York City
Offices in Principal Cities

HARPER *Chicago*
EVERLASTING FASTENINGS

BRASS • BRONZE • COPPER • EVERDUR • MONEL • STAINLESS

New Delta Chip-Breaker Grinder is simple, fast, dependable, accurate — and much lower in cost . . .

Gives all-around, long-time satisfaction in grinding the chip-breaker groove on carbide-tipped tools — used also for other production grinding.

In grinders costing many times as much, you do not find many of the new, exclusive features you get in this latest Delta machine. It's husky, solid (weight 700 pounds), over 6 feet high, an accurate machine designed to turn out a big volume of work. Yet its cost is amazingly low.

Spindle shaft specially designed. Bearings widely spaced to provide permanently true alignment. Wheel mounting system permits removing either wheel alone, or wheel and adapter. Table is smooth operating with convenient control wheels — rides solidly on long ways.

EQUIPPED WITH THE NEW "UNIVISE"

... holds the tool at any conceivable angle

Four distinct planes of adjustment. Can be accurately reset at a moment's notice so that the tool may be reground at *precisely* the same angles as originally set. Saves time, wheel wear. Eliminates bothersome and often inaccurate measurements.

With Univise and coolant attachment removed, this machine may be used as a regular surface grinder.



Delta Surface Grinder
Quickly moved to any spot, freeing machines costing ten times as much.



THE ARMY-NAVY "E" — awarded for excellence in the production of machine tools vitally needed in the war effort.

The features and performance of this Delta machine are amazing to those accustomed to paying far more than its cost. Investigate — be first in your plant to discover the convenience and economy of this new Delta grinder. See it at your Delta industrial distributor's — check priorities and deliveries.

TEAR OUT AND MAIL THIS COUPON FOR FULL DETAILS



THE DELTA MANUFACTURING COMPANY
704G E. Vienna Ave., Milwaukee 1, Wis.

Please send me your new catalog giving full details on the Delta Chip-Breaker Grinder and your full line of low-cost machine tools.

Name..... Position.....
Company.....
Address.....
City..... (.....) State.....
Zone.....



M-1B

NEWS OF INDUSTRY

(CONTINUED FROM PAGE 116)

Maximum Price Regulation No. 136

Machines and Parts, and Machinery Services

PRICE DETERMINATION

Acquisition by manufacturer of machines and parts of a machine shop rendering machinery services. A manufacturer of machines and parts acquired an entire machine shop which was engaged in rendering machinery services in the same competitive area as the manufacturer. The manufacturer moved the machines to his plant for his general use and engaged in the performance of machinery services for the first time, including service to some of the shop's former customers. The manufacturer's maximum prices for machinery services are those of the transferor, pursuant to Section 1390.28 entitled, Transfer of business stock in trade. A manufacturer who sells his products, operates a different type of establishment than one who sells machinery services. Hence, as used in Section 1390.28 "establishment" refers to the type of business being transferred, and since the manufacturer of machines and parts maintained a different type of establishment than a shop rendering machinery services, the manufacturer has acquired an "establishment separate from any establishment which he may previously have owned or operated."

Firm-price contracts—new list prices. A manufacturer entered into a firm-price contract for the sale of a product covered by the Regulation, at a price properly computed under Section 1390.7. During the pendency of the contract the manufacturer filed a report under Section 1390.13 and received approval of a new list price for the same product which is lower than the contract price. The manufacturer need not adjust his contract price on the balance of his deliveries under the contract to the level of his new list price, Section 1390.18 (b). A contract price, properly computed under Section 1390.7, need be recomputed only where the manufacturer's estimates of the prices of materials or services are found to exceed the supplier's actual prices therefor under Section 1390.7 (c) (4) (ii).

VIOLATIONS AND EVASIONS

Rebuilt and guaranteed second-hand machines—necessity for tearing down and rebuilding. While Section 1390.11 (b) contains no specific requirement that a machine which has been in use for five years or more must be torn down and rebuilt to qualify as a "rebuilt and guaranteed" machine, if such a machine has not actually been put through this reconditioning process there is a strong presumption of a violation if it is sold as "rebuilt and guaranteed," since the machine is likely to have worn or missing parts which must be repaired or replaced for satisfactory operation.

Price Schedule No. 4 Iron and Steel Scrap

PRICE DETERMINATION

Shipping points—scrap rejected and re-shipped without reworking. A car of steel scrap is rejected at the point of delivery and, without further preparation, is reshipped to another consumer who accepts the car. The shipper is entitled to the shipping point price for the grade involved, at the original shipping point, plus freight to the point of rejection, plus freight to the new point of delivery, subject to the springboard limitation of Section 1304.13 (d) (4).

many users of cold finished steels
are finding this new
Wyckoff weight chart *invaluable*



WYCKOFF DRAWN STEEL CO.

FIRST NATIONAL BANK BUILDING, PITTSBURGH, PA.
2200 SOUTH KESWEE AVENUE, CHICAGO, ILLINOIS

Rail-truck movement. Where foundries have no rail sidings and receive remote scrap by rail-truck movement, truck transportation is considered a continuation of the original rail transportation. The consumer may, therefore, absorb the railroad freight and the established trucking charge for the truck portion of the movement is made in a public carrier, (subject of course to the "springboard" limitations of Section 1304.13 (d) (4) on steel scrap). If the truck portion of the movement is made in the dealer's own motor vehicles, Section 1304.13 (d) (1) and 1304.15 (b) (1) limit the trucking charge to \$1.00 per gross ton.

Scrap delivered to a consumer's plant located off the line of originating railroad. The

War Production Board allocated rerolling rails owned by the P Railroad to a consumer in Los Angeles, California. The P Railroad operates in a basing point named in Appendix B. The consumer is located on a spur of the S Railroad but not on the line of the P Railroad. The P Railroad has rerolling rails at Portland, Oregon, and plans to ship these to the consumer. Although P Railroad's lines enter Los Angeles it proposes to ship the rail from Portland to Los Angeles by the S Railroad and charge the consumer freight from Portland to Los Angeles, or \$9 per gross ton. Under Section 1304.14 (a) (2) (ii) (b), the P Railroad may only charge freight to the consumer from the place where the lines of the

P Railroad goes nearest to the consumer's plant, which in this particular case would be 42 cents.

Preparation charges—"dealer." A company, although not a scrap dealer in the ordinary sense, may be a "dealer" within the meaning of Section 1304.13 (a) (5), entitled Special preparation charges, since the term as used in (ii) of that section is applicable to any person engaged in the preparation of scrap.

"Lowest established charge for transporting scrap." As used in the Schedule, the "lowest established charge for transporting scrap" is the charge applicable to most grades of scrap iron, and not a charge limited to a few special types of scrap, even though the shipment is one of the special types of scrap. Thus, in determining the shipping point price for No. 1 bundles where the general scrap iron freight rate is \$1.34 per gross ton, and there is also a \$1.10 rate for sheared crop ends for rebundling purposes, the established charge is the \$1.34 rate.

Price Schedule No. 41 Steel Castings

PRICE DETERMINATION

Federal transportation tax—miscellaneous steel castings—railroad specialties. Under Supplementary Order No. 31—Tax on Transportation of Property Imposed by Revenue Act of 1942, the 3% tax on freight bills is treated by OPA as an increase in freight. The following digests of interpretations have been given under the Schedule:

Miscellaneous steel castings. The tax may not be added in determining maximum prices for miscellaneous steel castings determined under Section 1306.112, since such prices are delivered prices, except: Where a producer determines his maximum prices under Section 1306.112 (a), and it was his customary practice on July 15, 1941, to make an allowance (e.g. 50 cents per 100 pounds) on sales made outside of his normal territory, he may add the transportation charges, including the tax, in excess of the allowance of 50 cents per 100 pounds.

Railroad Specialties. The tax may not be added to the maximum prices of railroad specialties delivered in base territory, since the maximum prices under Section 1306.113 are delivered prices. Where the railroad specialties are delivered outside of base territory, the producer may add to the maximum price only the tax on the transportation charges which the purchaser is required to pay pursuant to Section 1306.113 (a) (4).

Compliance Branch Using 130 Investigators on CMP

New York

• • • To promote increased compliance with WPB regulations under CMP, a staff of 130 investigators have begun checking the records of manufacturers operating under CMP in the New York-Northern New Jersey Region, John Peckham, WPB regional compliance chief, announced.

Operating out of seven district offices, the investigators will check the purchase records, inventories, bills of materials, and allotment control of manufacturers operating under CMP. CMP becomes fully effective July 1 with respect to steel, copper, and aluminum in all forms.



The BEARING that LUBRICATES itself

Oil is the life blood of every motive unit. In order to gain smooth, quiet operation; long, satisfactory bearing life, we must have the right amount of oil . . . in the right place . . . at the right time.

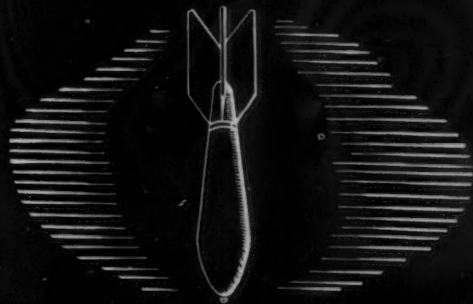
Johnson LEDALOYL bronze bearings provide this type of performance. Evenly distributed over all surfaces of every LEDALOYL bearing are millions of tiny, evenly spaced pores. Each of these pores serve as miniature oil reservoirs. Heat, generated by the turning of the shaft, draws the oil from the pores into the bearing area. Thus, a thin, protecting film of lubricant separates the shaft from the bearing, reduces friction to a minimum and assures long, satisfactory life. When the shaft stops, the oil is absorbed by the bearing.

Johnson LEDALOYL Bearings will help you simplify your designing problems . . . cut your installation costs. Before you start on a new design, get the facts regarding LEDALOYL. A Johnson Engineer will gladly review your applications at your convenience. Why not call him in . . . TODAY?

Over
2000 Stock Sizes

enable you to make
a further saving in
time and money. Write
for our new catalogue.





Who Wins Wars?

Strangely enough, the average man does! Much as we all detest war the fact is that under its stimulation a nation always develops new products with infinite peacetime applications. To date, scores of fantastic devices have been created for war purposes which one day will contribute mightily to the American Way of Life. Weatherhead is producing at the rate of *millions every day* many products that have peacetime application. Just as we've helped build cars, planes and refrigerators in the past, Weatherhead is well prepared to help you build these new products of tomorrow.

Look Ahead with



Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND, OHIO

*Manufacturers of vital parts for the automotive, aviation,
refrigeration and other key industries.*

Plants: Cleveland, Columbia City, Ind., Los Angeles
Canada—St. Thomas, Ontario

Announcing a complete NEW line of **LABORATORY FURNACES**

New in appearance and construction, Lindberg Laboratory Furnaces are available to the laboratories of the nation for drying precipitates, ash and carbon determinations, ignitions, melting, pyrometer calibrations, boiling, distilling, pilot heat treating and the many other precision

research operations that demand closely controlled temperatures.

These furnaces bring to the laboratory NEW features in construction and NEW benefits of performance such as found only in today's modern industrial furnaces. For example:

NEW! More accurate and efficient service is obtainable through the use of insulation, heating elements, controls and construction such as used in the latest industrial furnaces.

NEW! Rugged heating elements of the low voltage type permit higher operating temperatures with longer life and fewer replacements. These elements are patterned after the kind that daily stand the abuse of heavy schedules in production heat treating shops.

NEW! The smooth, "stepless" principle of the Lindberg Input Control gives any degree of heat required within the temperature range of the unit. It replaces the separate resistance type of control which proportions the heat in stages.

NEW! On larger units, furnace operation can be easily observed and controlled from plainly visible dials on the built-in panel which is complete with Lindberg Control, signal light and indicating pyrometer.

NEW! Convenient mechanical door operating mechanism, used in all production furnaces, is provided in the vertical lift doors of box units. Hot side of the door faces away from the operator thereby adding to his comfort in handling work in and out of the furnace.

NEW! Furnace design matches, in appearance, other modern laboratory equipment. The clean streamlined shape contributes to the high standard of laboratory neatness.

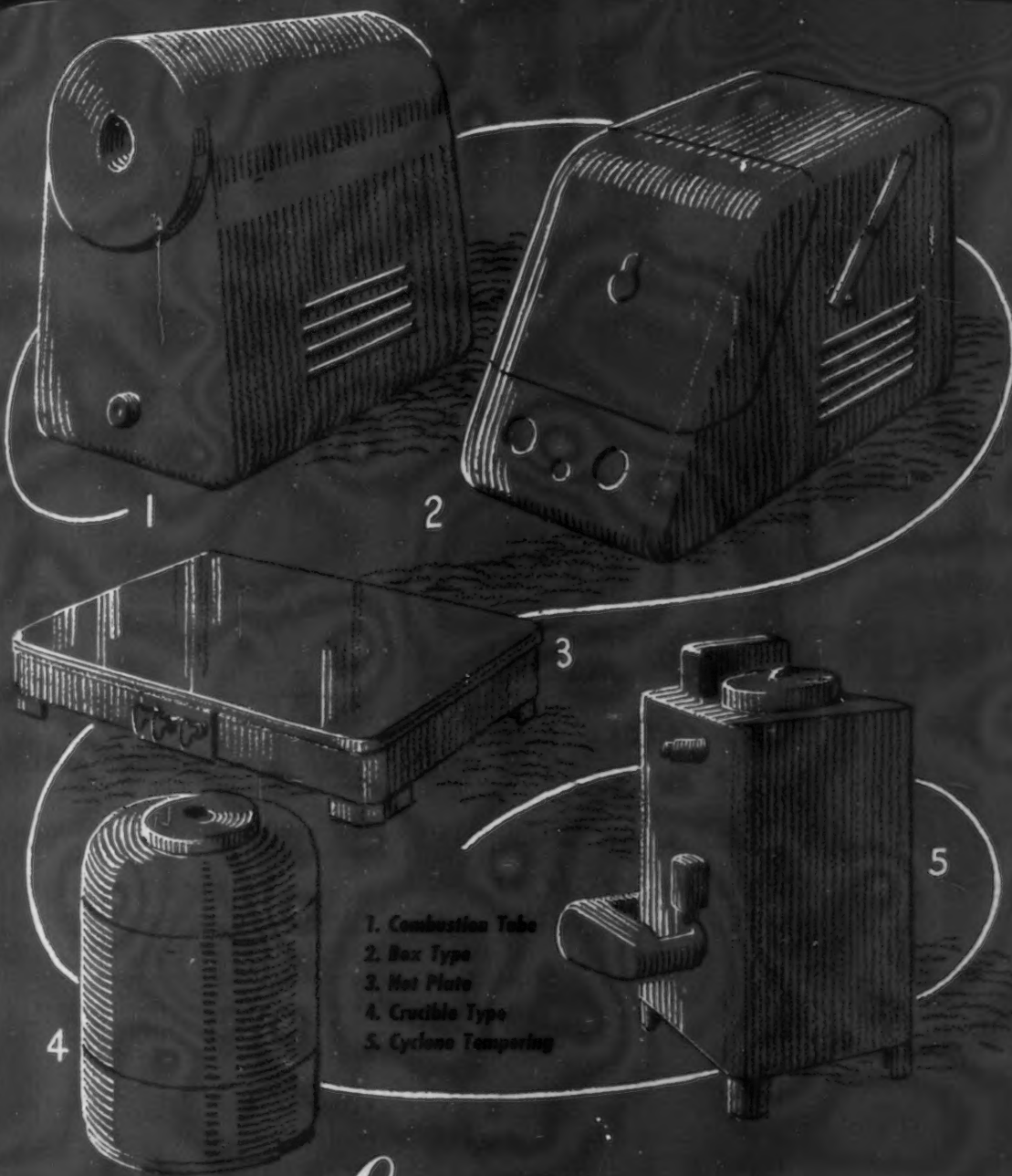
LABORATORY CYCLONE TEMPERING FURNACE

Heated with the uniform accuracy of the famous Lindberg air recirculating principle, the Cyclone Furnace is in wide use today for tem-

pering of steel, salt baths, nitriding, bright tempering and many other precision heating applications from 250°F., to 1250°F.

SOLD EXCLUSIVELY THROUGH LABORATORY EQUIPMENT DEALERS

Ask your dealer, or write to the Lindberg Engineering Company,
Department CM-6 for further information.



Lindberg



LINDBERG ENGINEERING COMPANY
2430 West Hubbard Street Chicago 12, Illinois

★

An institution well known throughout the world as the leader in developing and manufacturing industrial furnace equipment.



Briefly Told—**Conditions for Sale
of Enemy Properties
Issued by L. T. Crowley**

• Alien property custodian, Leo T. Crowley, recently issued an order prescribing conditions under which enemy properties will be offered for sale: Properties valued at less than \$10,000

may be sold at either public or private sale; larger business properties will be disposed of through public sale through sealed, competitive bids; some properties will be disposed of in gov-

ernment-regulated securities markets. Mr. Crowley emphasized that no properties are up for sale yet. Each public sale will be advertised at least 15 days in advance.

• Methods of attracting idle machines into the normal channels of distribution for resale were discussed at length by the used construction machinery industry advisory committee of WPB recently. It was pointed out to members of the committee that many contractors who had worked on army camp construction are holding large stocks of equipment in idleness in the expectation of further construction. The contractors fail to realize that the need for new army posts is practically non-existent and that the holding of construction equipment in idleness in the expectation of future military contracts may be a definite obstruction to other vital war-time projects.

• G. W. Wilson, manager of the transportation department, General Electric Co., stated recently that standardization of G-E switching locomotives had added approximately 185 locomotive years of switching to the war effort in 1942.

• Barium Stainless Steel Corp. has acquired 24 mining claims in Pennington County, South Dakota, for the production of tin, tungsten, mica and beryllium ores, and is proceeding to engage in the mining of these strategic war metals.

• Twice as many parts for Navy anti-aircraft gun mounts were turned out by men and women war workers at By-Products Steel Corp., Coatesville, in the eighth period of the 1943 fiscal year as were turned out in the same period two years ago, according to a report made recently by Robert W. Moffett, president.

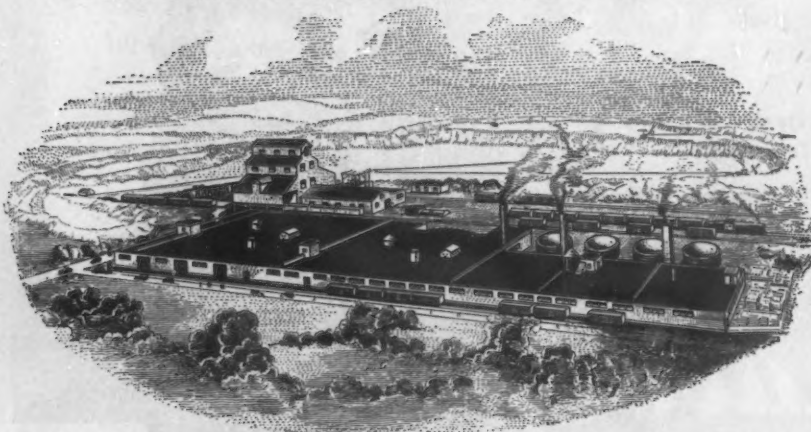
• In Milwaukee recently a worker on a machine cutting operation applied for a transfer because his present place of employment was so crowded he could not make the delicate adjustments necessary to do good work. Examination of the employer's premises revealed the truth of the worker's statement. It was suggested his machine be moved to a more secluded spot. The worker is satisfied.

• That more than 1,250,000 Illinois men and women are engaged in war work in more than 1600 Illinois war plants was revealed recently by Governor Dwight H. Green, who spoke to several thousand employees and guests of the Pullman-Standard Car Mfg. Co., at its Calumet shipyards. Appearing as the speaker on the launching program of the fourth submarine patrol craft to be completed by the company in less than six weeks, Governor Green also revealed that more than 600,000 Illinois men and women are serving in the nation's armed forces.

• At the 31st annual convention of the American Electroplaters' Society in Buffalo, the following officers were elected: President, George Wagner, Newark, N. J.; first vice-president, Maurice R. Caldwell, Grand Rapids, Mich.; second vice-president, Clarence C. Helmle, Bridgeport, Conn.; and third vice-president, Walter Pinner, Detroit.

**GOOSE LAKE**

**Fire Clay and
Fire Clay Flour
Fire Clay Brick
Therm-O-Flake Insulation**



Goose Lake Clay Deposit with Clay Grinding and Fire Brick Plant



JOLIET, ILL.

From SHIPS to CARS



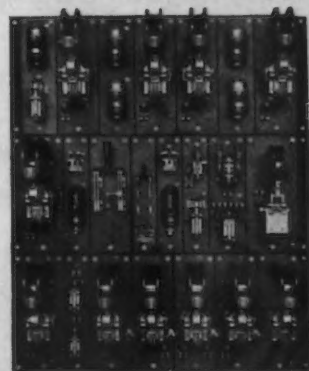
EC&M Control *speeds* ORE MOVEMENT

IN HULETT Unloader work, the distance the load travels is relatively short (a round trip from boat-to-hopper-to-boat requiring as little as 48 seconds time). EC&M LINE-ARC Magnetic Contactor Control fulfills the requirements of this *high speed* operation in an outstanding manner.

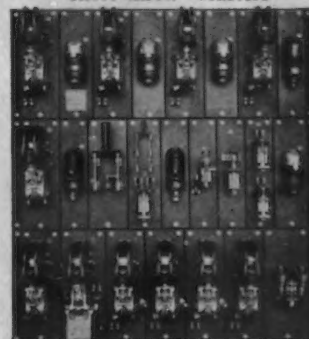
First, EC&M quick-responding LINE-ARC Magnetic Contactors permit almost instantaneous movement of the Bucket, Beam or Trolley motions when the operator manipulates his Master Switch. This means greater maneuverability for "clean-up" as well as faster operation for normal unloading.

Second, the LINE-ARC principle controls the arc so that contact-life is materially increased and there is no destructive burning of the arc shields. The result is low up-keep cost, due not only to fewer replacements but also to less inspection.

Before purchasing control for ore unloading or ore handling machines, we invite your investigation of EC&M Magnetic Control which uses the *time-saving, economically-operating* LINE-ARC Contactors.



Reversing-plugging, dynamic braking TROLLEY Controller. All controllers operated by "short-throw" Masters

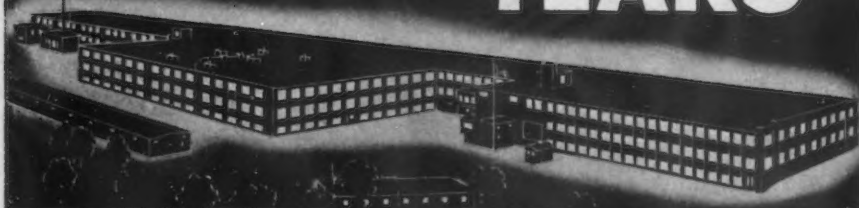


Typical BUCKET-CLOSING Controller of the reversing-plugging, dynamic braking type for Hulett Unloader



THE ELECTRIC CONTROLLER & MFG. CO.
CLEVELAND, 4 ★ OHIO

NIGHT *and* DAY for TWENTY-FIVE YEARS

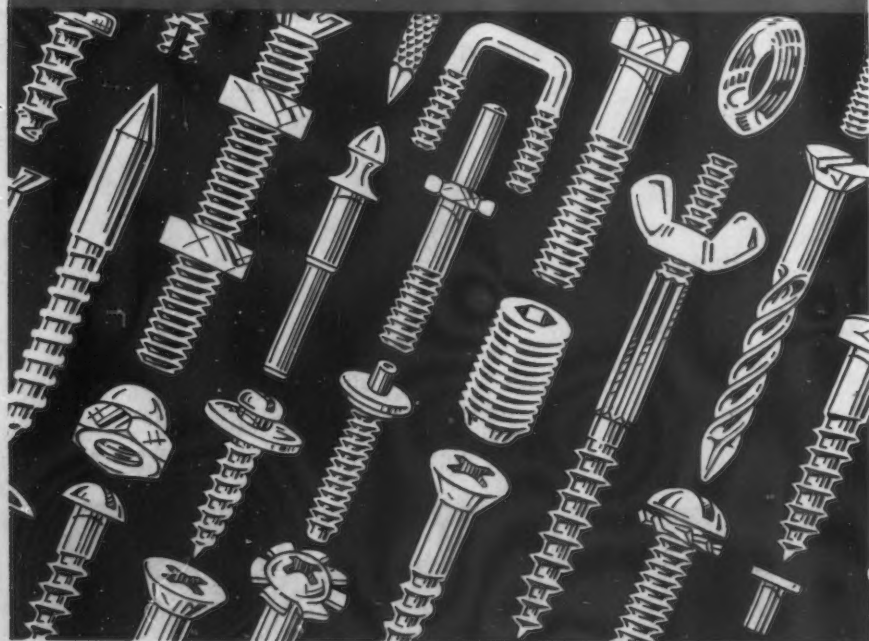


War Production is 24 hour a day production, but 'round the clock operation here at Continental is not a war inspired innovation. For over a quarter of a century a three-shift work schedule has enabled this company to supply industry efficiently and economically with huge quantities of precision fastenings for every type of assembling. War requirements are met by the same orderly efficiency, augmented by greater production facilities.

Since 1904 Continental Screw Co., has continued to provide the finest fastenings science can devise.

CONTINENTAL SCREW CO.

New Bedford, Mass., U.S.A.
BUY MORE WAR BONDS



NEWS OF

• The U. S. Circuit Court of Appeals has upheld a decision by district Judge John Knight of Buffalo that the Houde Engineering Corp did not infringe the Pennington Engineering Co.'s patent for shock absorbers.

• The Milwaukee Tool & Die Co., Milwaukee, suspended war production operations long enough to have a house warming for its friends in the new streamlined and modernly equipped plant at 4050 N. 34 St. The enterprise started two years ago in a small barn on the outskirts of the city, with Fred Busch and Albert Terwelp, former machinists, as partners.

(CONTINUED ON PAGE 144)

Canadian Steel for Civilians Still Scarce

Toronto

• • • While a recent announcement by C. D. Howe, Minister of Munitions and Supply, indicates more steel will be made available for civilian use, so far nothing definite has developed in this direction. Steel company officials say direct war business is absorbing practically all production, and bookings extend to the end of the year. Although mills are accepting civilian orders, deliveries are uncertain and this new business is being filled only when some surplus stocks in excess of war requirements or off heat lines are available. There has been some recent easing in supply of plates, sheets and other steel for producing rolling stock and agricultural implements, but otherwise comparatively little steel is going to consumers other than those directly associated with war production.

Permission has been granted to increase barbed wire production approximately 86,250 reels. The order establishes each manufacturer's quota at 100 per cent by weight of the average yearly tonnage produced for consumption in Canada in the five years, 1937 to 1941. This quota is for the period April 1, 1943, to March 31, 1944, and involves an increase of about 2376 tons of wire. This move, Mr. Foreman said, has been made possible by an increase in the supply of available raw material and is designed to assist in meeting the heavy demand for wire from the farm communities.

Dealing with the above order, steel mill officials say they are still faced with shortage of wire rods, and there is some doubt that the increased output of barbed wire can be attained unless more steel is made available. This could only be done at the expense of other departments, whose present output is more important than wire.

Morale Movies Offered Workers

••• Both the War Department and the Navy have recently announced the availability of new movies for display to war workers and their families. These are available in either 16mm. or 35 mm. at nominal charge with or without screens and projection equipment. A good selection of titles has been offered.

To obtain information on War Department films, address the War Production Drive Headquarters, WPB, Washington. Inquiries regarding Navy films should be addressed to Industrial Incentive Div., Navy Dep't., 2118 Massachusetts Ave., N. W., Washington.

Navy Sues to Obtain Warren City Tank Plant

Cleveland

••• Suit to obtain the Warren City Tank & Boiler Co. plant at Warren, Ohio, for the U. S. Navy, was filed in Federal Court in Cleveland on June 14 by U. S. District Attorney Dan C. Miller. The plant, which was formerly owned by the Taylor-Winfield Corp., produces diesel motor blocks, marine gear casings and a variety of other parts for naval vessels. The plant was equipped by DPC and the Navy. The valuation of the plant in the condemnation suit is placed at \$306,000. Six months ago, Don D. Gordon was relieved as general manager and replaced by Carl Bauer of the Higgins Shipbuilding Corp., New Orleans. In recent months, the company has been involved in labor difficulties.

April 6 the local of the United Electrical Radio & Machine Workers of America (CIO) protested in a resolution to the WPB and U. S. Navy that "thousands of manhours on critical machines are being lost every day." The union claimed a survey showed loss of 7000 manhours every 24 hr. and that management said the company could not meet price competition.

In mid-April there was a two-day stoppage of work in the plant, due to the inability of management and labor to agree on a new contract.

COMING EVENTS

- June 28 to July 2—ASTM Annual Meeting, Pittsburgh.
- Oct. 13 to 16—The Electrochemical Society, Inc., New York.
- Oct. 18 to 22—National Metal Congress and Exposition, Chicago.
- Oct. 28, 29—American Institute of Mining Engineers and American Society of Mechanical Engineers, Pittsburgh.

↑
ON
PUSH
OFF
↓

HOT ARCS STOPPED COLD!

Bulldog's Vacu-Break Safety Switch with "Clampmatic" Contacts provides the faster, tighter closing—and quicker, smoother opening—needed for safest, most dependable operation at lowest maintenance cost.

ON

"Clampmatic" switch contacts exert a wedging action when engaged with the beveled ends of the stationary contact prongs. This wedging action puts great pressure on the movable slug, for positive pressure contact in ON position.

OFF

When the handle is pushed to OFF position, the static energy stored in clamp spring helps make an easier, smoother separation of contacts. This quick-break operation in the close-fitting arc chamber creates a MAGNETIC BLOW-OUT effect which quickly dissipates arcing.



Streamlined, push type, front-operated rocker handle inside cabinet lines.

BULLDOG *Vacu-Break* SAFETY SWITCH

with "Clampmatic" Contacts and front-operated Rocker Handle.

Movement to OFF is speeded by release of static energy in clamping spring.

Formed bakelite cover (arcing chamber) removed from switch head to show action.



Instant, positive pressure contact caused by wedging action of moving contact when operating to ON position.



Full ON position. Moving contact now fits tightly between stationary Line and Load contacts under full clamping pressure of the spring.

BULLDOG ELECTRIC PRODUCTS CO.

Detroit, Michigan

Bulldog Electric Products of Canada, Ltd., Toronto, Ontario
Field Engineering Offices
in All Principal Cities



MANUFACTURERS OF Vacu-Break Safety Switches, SafeToFuse Panelboards, Circuit Master Breakers, Switchboards, Bus Duct Systems—FOR LIGHT AND POWER.

BUY MORE WAR BONDS

War Finishes Dominate Electroplaters Convention

(CONTINUED FROM PAGE 62)

where only restricted areas can be touched and the burr is of such nature that it can be best removed by abrasives firmly fastened to the polishing medium. An added advantage is that the work leaves the polishing operation clean and dry.

Conventional polishing wheels, coated with hot glue or cold cement, rolled in abrasive grain, allowed to stand a number of hours till set, are widely used for burr removal when

the edges of the work are straight or regular, or where the amount of metal to be removed is such that the process can be called snagging. Flexible polishing wheels providing a dry resilient abrading head are recommended for burring on all parts having irregular contours where a rigid, unyielding hard wheel could not touch the burrs without destroying vital tolerances.

In flexible polishing, the cutting

face is formed and maintained by periodic frictional transfer of greaseless compound in bar form to the revolving wheel or bob. The desired degree of flexibility is attained by selection of the wheel of proper resiliency. Where minimum cushion or give is needed, felt, compressed canvas, sheepskin and muslin wheels in which the sewed sections are glued together, are employed. For greater flexibility the choice falls on sewed buffs, loose full disc buffs, packed buffs and string wheels in the order named. The string wheel, comparatively new in the finishing field, is similar to a bristle brush with cotton string substituted for the bristles. In conjunction with greaseless compound it is ideal for the burring of precisely machined aluminum parts and parts of harder metals with extremely fine tolerances.

After the face of the wheel has been broken in by use of a vitrified abrasive stone, greaseless compound is applied by friction to the moving face and after running approximately half a minute, the binder has hardened sufficiently, fastening the abrasive grains firmly to the face so that the wheel is ready to abrade metal and remove burrs. Speeds usually vary between 5000 and 6000 surface ft. per min. This recommended surface speed should be borne well in mind especially with small wheels and bobs for internal burring, as it is a common error to neglect to provide sufficient arbor speed in these cases. For instance, a 1 in. diameter bob at 3600 r.p.m. will give only 940 s.f.m. It is necessary in some plants using flexible power tools with bobs fractions of an inch in diameter to run up to 100,000 r.p.m.

A number of ordnance parts have sharp burrs on edges that, because of the design of the piece, can be hit only perpendicular to the face of the wheels. Coarse greaseless compound on a sewed buff removes these burrs satisfactorily, but often such pieces, because of design, cause a sharp raking action and the abrading face is cut off too rapidly. In such instances a sizing coat compatible with the greaseless compound should be first applied to the wheel. This sizing coat in bar form is transferred to the wheel by friction and after running for about a minute the greaseless compound is added in the usual manner.

It is sometimes desirable with certain heavy burrs to have a more rugged, although somewhat less flexible, head than that described above and this can be obtained by using the same two materials with a different



HAVING INSPECTION TROUBLES?

Goods turned back when presumably ready to ship? If it is caused by dirt or dust, it can be eliminated.

Start with your stock bins — it will only take a few minutes if you use Spencer Vacuum. Then clean your raw materials, floors, walls, and ceilings, so that dust cannot spread.

Keep your machines clean with vacuum, ready for top performance in the long pull. And finally, clean with vacuum on your benches and final assembly and the package itself. Inexperienced men or women can do it and the cost is less with Spencer in the long run.

Portable units from 3/4 to 20 horse power, stationary units from 1 1/2 horse power up — with a wide range of industrial hose and tools. Ask for Bulletin No. 125.

243 F



SPENCER VACUUM CLEANING

THE SPENCER TURBINE COMPANY, HARTFORD, CONN.



"GREEN HANDS FROM SCHOOLS COULDN'T BURN TOOLS"

Quotes POR-OS-WAY'S
War Plant Reporter
from Interview

Dear Charlie:
I'm at the ~~factory~~ plant where they're using Por-os-way wheels to grind carbide-tipped tools free hand and dry. Even here they've boosted production over 40% and in their own words "green hands from training schools couldn't burn tools." In fact, they said the action is "hardly get warm". Cool carbide tools. Be seeing you.
Your roving reporter
Vic

THE JOB:

Grinding free hand and dry on Excello Tool Grinder carbide-tipped tools 1" x 1" x 6", for turning air-plane struts, shaping air-plane carburetors, shaping and turning gun turrets for planes.

THE WHEEL: Por-os-way 10" x 2" x 2" C54KV3

All facts and figures given are taken from an actual field survey made by a Por-os-way correspondent

THE RECORD	POR-OS-WAY WHEEL	FORMER WHEEL
Number tools per hour per man	37	26
Number of dressings required	NONE	Every 2 hours
Pieces per wheel	888	520
Stock to be removed	.000"—.250"	same
Wheel life	24 hours	20 hours
Depth of cut	.002"—.010"	Tools burned when jammed into wheel
Number of passes required	12	48
Amount of rejects	0	50 per day (scrapped)
Increase in production	42.3%	



WRITE, for complete booklet "Facts About Por-os-way". The address is 434 Wheatland Street, Phoenixville, Pennsylvania.

POR-OS-WAY*

a new

RADIAC* PRODUCT

2 TO 5 TIMES
MORE WAR PRODUCTION
PER MAN PER MACHINE



A. P. DE SANNO & SON, INC.
NEW YORK, CHICAGO, PITTSBURGH,
CLEVELAND, DETROIT, LOS ANGELES



PHOENIXVILLE, PENNA.
Western Gateway to
VALLEY FORGE

*U. S. Pat. Off.
COPYRIGHT, 1943, A. P. de Sanno & Son, Inc.

technique. The bar of sizing material is brought to the revolving wheel and pressure applied as the power is cut off. This allows a heavy sizing coat to melt and flow onto the surface of the wheel. The lathe is then turned on and off to start drying at less than full speed and then run at full speed till the sizing coat is not sticky to the touch. The total drying time is about 2 min. The bar of greaseless compound is applied in the same manner, pressure being applied as the power is shut off. The drying proce-

dures and its duration is again the same as for the sizing coat. Heads 3/16 in. thick are possible by this procedure, although it is generally necessary to make a second application of greaseless compound for the thicker coatings. It is essential that the stop and start technique be followed closely.

Each burring problem calls for individual analysis. However, the one procedure most widely used in burring armament parts by flexible polishing calls for greaseless compound with

No. 100 fused aluminum oxide on a sewed buff at about 5000 s.f.m. Contrasting this with the most popular flexible polishing procedure on civilian goods which called for greaseless compound with No. 220 aluminum oxide on a loose full disc buff, indicates the trend in finishing caused by the war.

Various aspects of chrome, black nickel and silver plating, zinc embrittlement, salvage by electrodeposition, and de-ionization of water and the place of powder metallurgy in electroplating are discussed in the papers reported on in next week's installment on the Electroplaters and Finishers Convention. The report, which is in three parts, will be concluded the following weeks.

Metallurgical Control Through Calculated Hardenability

(CONCLUDED FROM PAGE 42)

sample and determining the hardness of the center.

Having decided on the correction to apply to the calculated hardenability for desired structure, and also having found the correction necessary to compensate for the varying severity of quench, the resulting corrected hardenability figure required to obtain desired hardening characteristics can be plotted against actual diameter or section and the resulting curve applied to each quench. It is then possible, knowing the analysis, the grain size, and the size section of a piece of steel to be treated, to determine from the curves which quench will produce the desired results.

For example from Fig. 4, if a piece of 1½ in. round material were submitted for hardening and the analysis found to give a calculated hardenability of 3.0, it can be seen that the hardenability is slightly greater than that required, and quenching in a bath with an H factor of 1.0, would produce satisfactory hardening. With such curves for each quench tank the chances of error are greatly reduced.

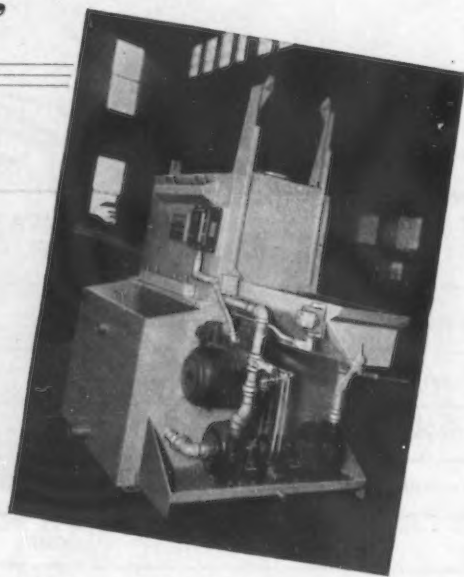
When using calculated hardenability as a control, standardization is of prime importance as it is in all other types of control. Discrepancies in results can usually be traced to variations in melting practice, grain size, or quenching procedure, and as long as these factors remain fairly constant, the control and predictions become surprisingly reliable.

Note: The writer wishes to express his appreciation for information received from M. T. Archer, director of research, National Supply Co.

When Space and Production are limited... here's "big little 5 x 5"

RANSOHOFF CLEANING EQUIPMENT

*for washing and
rinsing projec-
tiles, highly fin-
ished machine
parts and mis-
cellaneous work*



THIS small but mighty cleaning machine (it's only 5 ft. square) really does a big job at lowest possible cost. Work is loaded and unloaded from one end of the machine. It is handled in racks which are placed on a carriage and pushed into the machine, the door is closed and the pump started. The carriage is moved back and forth under the spray by a handle extending through a stuffing box in the end of the machine.

*It will pay you to look into this . . .
we'll be glad to give you full details.*

[One of these days . . . soon . . . you'll be seeing an important announcement about a new Ransohoff Rotary Cleaning Machine. Look for it!]

N. RANSOHOFF, Inc. 1315 Township Ave.
CINCINNATI, O.

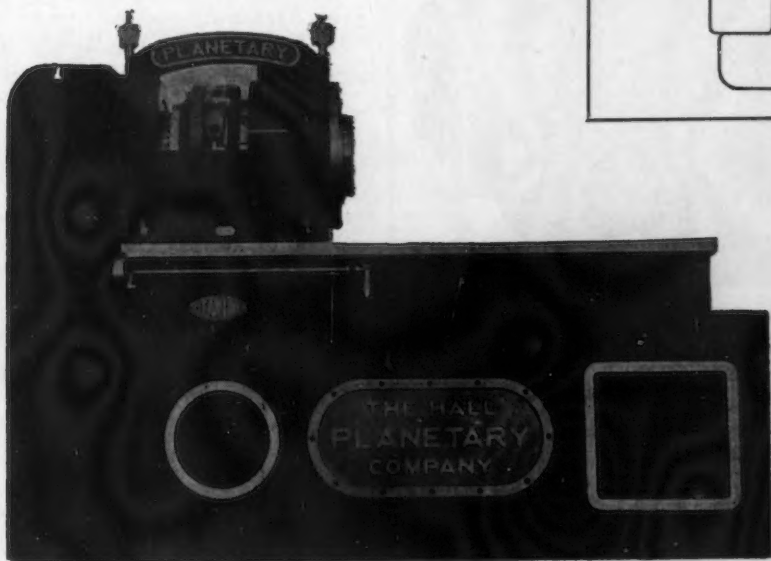
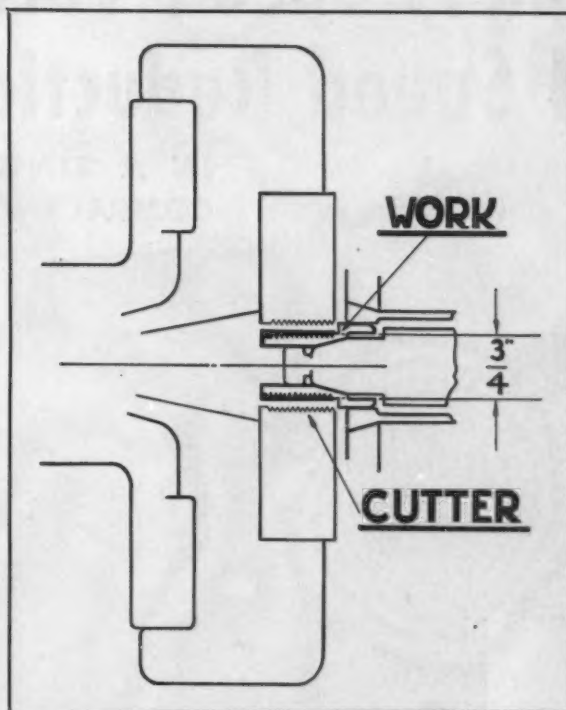


PLANATHREADING

Here is the setup for threading spark plugs for aircraft engines. The requirements are extreme accuracy in conformance with the usual aircraft tolerances. The thread must be very smooth because it screws into the relatively softer metal of the cylinder head.

Production is 5 pieces per minute on hand loading, and 8 pieces per minute on magazine feed.

All exacting requirements adequately met.



HALL PLANETARY CO.

FOX & ABBOTSFORD AVE., PHILADELPHIA 29, PA.

DPC Authorizes Numerous Contracts

Washington

• • • Defense Plant Corp., RFC subsidiary, has authorized the following contracts:

Authorization for construction of additional facilities in Rapides Parish, La., to cost in excess of one million dollars. Work will be supervised by the Little Rock district office of the Corps of Engineers.

Authorization for construction of an Army General Hospital in Henrico County, Virginia, to cost in excess of one million dollars. Work incident to this project is

to be supervised by the Norfolk, Virginia, District Office of the Corps of Engineers.

Authorization for construction of additional facilities at an Army Air Forces installation in Oklahoma County, Okla., to cost in excess of two million dollars. Work incident to this project is to be supervised by the Tulsa, Okla., District Office of the Corps of Engineers.

Award of a contract to Peter Kiewit Sons' Co., and Condon-Cunningham Co., Omaha, Neb., for construction of additional facilities at an Army Air Forces installation in Sarpy County, Nebraska, to cost in excess of one million dollars. This work is to be supervised by the Omaha, Neb., District Office of the Corps of Engineers.

Award of a contract to J. A. Terteling

& Sons, Boise, Idaho, for construction of an Army Air Forces installation in Elmore County, Idaho, to cost in excess of one million dollars. This work is to be supervised by the Portland, Ore., District Office of the Corps of Engineers.

Award of a contract to the Western Contracting Corp., Sioux City, Iowa, for construction of an Army Air Forces installation in Jefferson County, Ky., to cost in excess of one million dollars. This work is to be supervised by the Louisville, Ky., District Office of the Corps of Engineers.

Allis-Chalmers Mfg. Co., Milwaukee, to provide additional plant facilities in Wisconsin at a cost in excess of \$2,000,000, making a total commitment of more than \$25,000,000.

General Electric Co., Schenectady, to provide additional plant facilities in New York at a cost in excess of \$775,000, making a total commitment of more than \$16,600,000.

The Timken Roller Bearing Co., Dayton, Ohio, to provide additional facilities for a plant in Ohio, at a cost in excess of \$80,000, making a total commitment of more than \$1,850,000.

Athletic Mining & Smelting Co., Fort Smith, Ark., to provide plant facilities in Arkansas at a cost in excess of \$550,000.

Armour & Co., Chicago, to provide equipment at a plant in Texas at a cost in excess of \$235,000.

Victor Chemical Works, Chicago, to provide additional facilities at a plant in Illinois at a cost in excess of \$50,000.

Ford Motor Co., Detroit, to provide additional facilities for a plant in Michigan at a cost in excess of \$3,300,000, making a total commitment of more than \$82,600,000.

Mathieson Alkali Works, Inc., New York, to provide additional plant facilities in Louisiana at a cost in excess of \$11,000,000, making a total commitment of more than \$45,700,000.

Diamond Alkali Co., Pittsburgh, to provide additional facilities at a plant in Ohio at a cost in excess of \$2,700,000, making a total commitment of more than \$18,700,000.

Republic Steel Corp., Cleveland, to provide additional plant facilities in Ohio at a cost in excess of \$875,000, making a total commitment of more than \$4,775,000.

P. R. Mallory & Co., Inc., Indianapolis, to provide additional equipment for a plant in Indiana at a cost in excess of \$50,000, making a total commitment of more than \$2,600,000.

Owens-Corning Fiberglas Corp., Toledo, to provide additional equipment for plants in Ohio, Rhode Island and Pennsylvania at a cost in excess of \$530,000, making a total commitment of more than \$2,350,000.

Pittsburgh Steel Co., Pittsburgh, to provide additional facilities at a plant in Pennsylvania at a cost in excess of \$450,000, making a total commitment of more than \$1,500,000.

Borg-Warner Corp., Detroit, to provide plant facilities in Illinois at a cost in excess of \$410,000.

Drexel Furniture Co., Morganton, N. C., to provide plant facilities in North Carolina at a cost in excess of \$175,000.

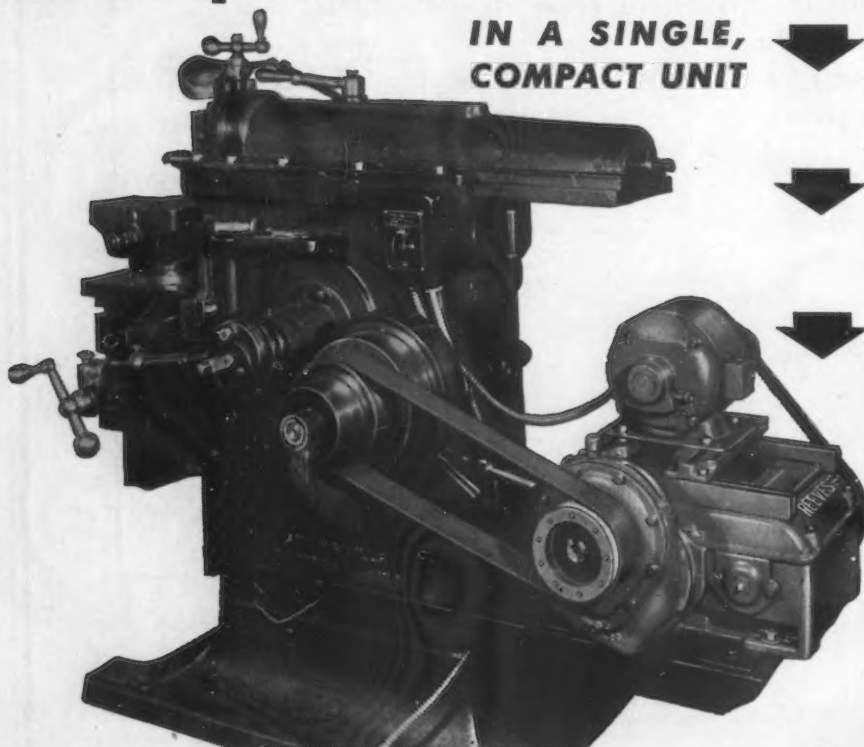
Tubular Alloys Steel Corp., Pittsburgh, to provide additional equipment for a plant in Indiana at a cost in excess of \$930,000, making a total commitment of more than \$12,000,000.

Colorado Fuel & Iron Corp., Denver, to provide plant facilities in Colorado at a cost in excess of \$5,500,000.

Sylvania Electric Products, Inc., Emporium, Pa., to provide additional facilities for three plants in Pennsylvania at a cost in excess of \$360,000, making a total commitment of more than \$600,000.

Stepless Speed Variation and Speed Reduction...

IN A SINGLE,
COMPACT UNIT



Pictured here is a REEVES Reducer-Type Transmission, horizontal design, with individual motor drive, applied to a shaper. With this new REEVES drive, which consists of the famous REEVES Variable Speed Transmission and built-in, helical-type speed reducer, the operator of any production machine has a wide range of low driving speeds instantly available in a single, compact unit. Entire range is covered without steps or jumps. Any required speed is accurately obtained by turning handwheel—without stopping driven machine. Easily equipped for individual motor drive by means of REEVES adjustable motor base, which accommodates any available motor. Catalog ITR-432 gives full details of this new REEVES drive. Write for it.

REEVES PULLEY CO., COLUMBUS, INDIANA

REEVES SPEED CONTROL

*He Never Has to Take His Eyes
Off the Cutter and Work*

DEVLIEG JIGMIL



Spindle start, stop and reverse—

Power vertical feed and rapid traverse movement—

Power horizontal feed and rapid traverse movement—

Power automatic table retraction and repositioning—

Power feed and rapid traverse to bar movement—

are all carried in a master switch on the spindle head—at the operator's finger tips.

Thus, the operator of the DeVlieg Jigmil can fix his vision on the cutter and work—never has to look at controls during operation.

The Jigmil is what a machine tool should be—a powerful and accurate extension of the operator's hand. The value in precision boring and milling is apparent.

It's a NEW Type Machine

Spacing Accuracy of a Jig Borer . . . Performance

Qualities of a Milling Machine . . . Convenience and Flexibility of a Horizontal Boring Mill.

New speed of operation . . . New standards of excellence of bored holes . . . New accuracy in milling . . . Automatic table retraction and repositioning dependable within .0002".

Many machines show 75% greater average daily productivity.



DEVLIEG MACHINE COMPANY

450 FAIR AVENUE, FERNDAL (DETROIT), MICHIGAN

Full CMP Operation Period Arrives; Review of Recent Modifications Given

New York

• • • With CMP in full operation July 1, a brief review of some of the recent modifications which affect third quarter operations has been compiled by THE IRON AGE.

The limitations of monthly percentages controlling the placement of controlled material orders have been abolished. The sequence of necessity to meet authorized production sched-

ules should now govern order placement.

The numerical method of identifying months and quarters also has been replaced by the requirement that the actual quarter be shown for which the purchase authority is valid. Thus 3Q43 instead of 19. The month of delivery must be shown on controlled material orders as (August, 1943) instead of by number, as well as the quarter, shown 3Q43.

A rated order is expected to be delivered in the month scheduled. If delayed, it must be filled within the first 15 days of the following month or the order sent back for reallocation. Should any producer not be able to ship an order within either of the two months following, he must tentatively book the order, notifying the customer and receive a confirmation of the new schedule. Orders for replacement of rejected controlled material take precedence over all other CMP orders on mill schedules.

Ratings on MRO orders placed before May 16 need not be downrated in cases where entire industries have been reclassified. Preference ratings assigned with advance allotments of controlled materials and used on orders placed prior to May 16 need not be changed even though a rating assigned with a third quarter allotment may be lower.

Inventory restrictions have been tightened so that material is considered to be inventory until it actually enters into production. This includes in inventory, material which has had minor operations performed, such as painting, thus effectively holding inventories to the 60-day basis.

New instruction for the preparation of Bills of Material have been issued superseding previous instructions. Major change is in the provisions concerning Complete Bills of Material which cover requirements for both Class A and B products needed in major repetitive products such as airplanes.

A new Class B Product List and Class A Civilian Type End Product List are now in effect and should be used rather than the list published Dec. 21, 1942.

New form numbers are soon going to replace the familiar PD numbers with WPB numbers which will require a complete change in your form filing system and any flow charts of monthly reporting schedules previously used based on PD numbers. There is no numerical sequence between the old and the new numbers.

Small order procedure has been

MEAKER EQUIPMENT

for

PLATING
CLEANING
PICKLING
GALVANIZING
(electro-process)

**MEAKER
PROCESS**

for

Electro-Galvanizing
Wire

ECONOMIZES ON ZINC

Produces Uniform Thickness

At All Points

When you buy equipment for plating, buy with an eye on quick conversion to peacetime decorative plating with nickel, chrome, copper, brass, etc. Meaker equipment can be changed over to the peacetime job in a jiffy. Fact, many of our customers right now are getting new equipment to hustle that war job, and hustle that peace job, too, as soon as we have finished the Axis.

The Nation's Leading Practical Plating Engineers

The MEAKER Co.

1635 SOUTH 55TH AVENUE, CHICAGO

*"Who says a
War Job is Tiring?
...WHEN IT'S SO EASY
TO DO GOOD WORK!"*



*Fatigue is the Chief Absentee where Assemblies
are made with **AMERICAN PHILLIPS SCREWS***

War jobs are *not* tiring when assembly work is done with *automatically straight-driven* American Phillips Screws. Even inexperienced hands catch on quickly to the simple routine of aiming and driving with one hand, while the other hand braces the work. No nerve-strain . . . because there's no chance of fumbling starts and wobbly, crooked driving . . . hence no undue weariness that slows production. Instead, always the stimulating incentive of work well done . . . because the non-slip connection between the 4-winged driver and the tapered recess of the American Phillips screw-head means that operators literally *can't miss*. Hour after hour, each American Phillips fastening duplicates all others, with a screw-head that sets up tight and plumb-level. No burred or broken heads, no gouged work-surfaces.

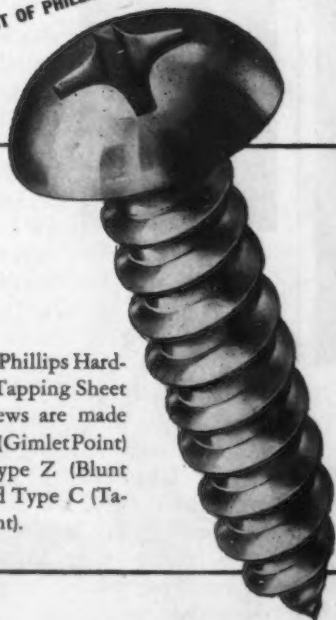
That's why women who drive American Phillips Screws can outwork men who drive slotted screws . . . *by 50% or more*. And that's why plants that tried American Phillips Screws continue to use them. You can bank on American for all types and sizes of Phillips Screws . . . every order piece-inspected for conformance to American standards of quality. Let American help *you* to "put the screws on the Axis"—*faster*.

AMERICAN SCREW COMPANY

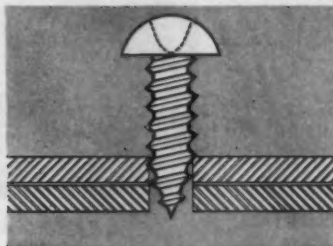
PROVIDENCE, RHODE ISLAND

Chicago: 589 E. Illinois Street Detroit: 5-267 General Motors Building

4-WINGED DRIVER CAN'T TWIST
OUT OF PHILLIPS RECESSED HEAD



American Phillips Hardened Self-Tapping Sheet Metal Screws are made in Type A (Gimlet Point) shown, Type Z (Blunt Point), and Type C (Tapered Point).



American Phillips Driver and Screw form a single, straight-line driving unit . . . and stay that way until screw is completely driven in.



American Phillips Hardened Self-Tapping Sheet Metal Screw sets up tight and straight in drilled or clean-punched holes.

clarified to indicate that using it to obtain Class A products need not reduce an allotment by the amount of controlled material required by the product.

Delivery by producers of controlled materials to fill sample orders for testing purposes does not require an allotment providing that the quantity delivered to one customer in any one

month does not exceed 1 per cent of the prescribed minimum mill quantity.

Manufacturers have been warned against the indiscriminate use of assigned preference rating in the purchase of products which they are normally able to produce themselves. Rounding out a line is permitted using the assigned ratings.

Manufacturers of Class B products

who have been assigned allotments of controlled materials for the third quarter and the first three quarters of 1944 must now file applications for fourth quarter allotments despite these tentative allotments.

Foundries producing steel castings have been notified to set aside a portion of their total capacity per month for emergency MRO orders. This is due to a bottleneck which has been forming in steel casting supply.

BEW load directives to steel mills to cover export orders do not include finished articles made of steel. Orders from domestic manufacturers for steel products to incorporate in A products to be exported do not count against this load directive.

Steel producers must now file daily reports of orders accepted with WPB according to recent instructions of H. C. Batcheller.

Controlled material consumers must report all unused allotments to WPB for reallocation in the third quarter. WPB-3029 is the report form.

• • •

Milestones

• • • In celebration of the corporation's twenty-fifth anniversary year, more than 800 employees, stockholders and guests were entertained by

Lempco Products, Inc., Bedford, Ohio, at a dinner dance recently in Cleveland.

Lempco started in business in 1918 making axle shafts for automobiles. It was founded by James F. Strnad, president, and John Y. Blazek, now secretary and general plant superintendent. In addition to the

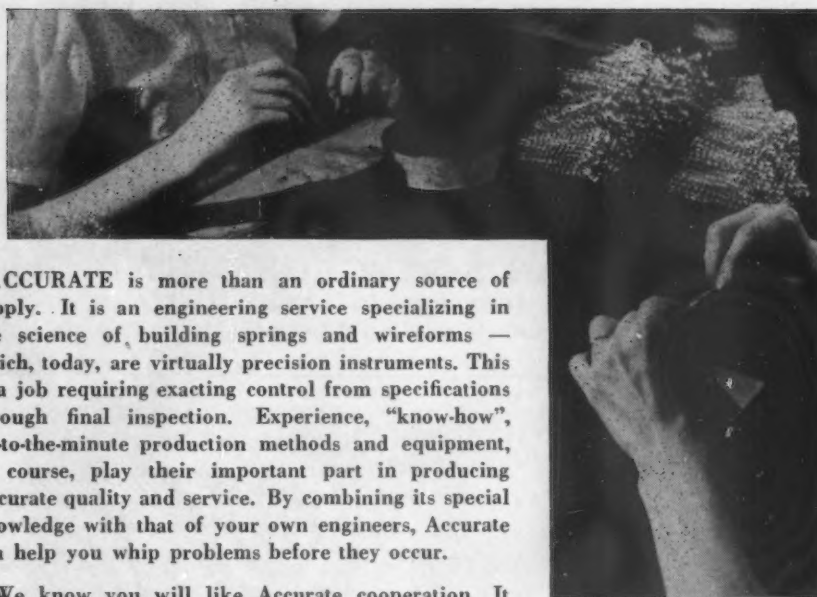
production of material used directly in the war effort which is Lempco's main business today, its machine tool division is engaged in manufacturing various types of grinders and presses and its Chicago automotive equipment division is producing a variety of service tools. For the past two years the company has been importing the entire production of shapers made to its specifications by a plant in the Argentine.



J. F. STRNAD



Insures ACCURATE SPRINGS



ACCURATE is more than an ordinary source of supply. It is an engineering service specializing in the science of building springs and wireforms — which, today, are virtually precision instruments. This is a job requiring exacting control from specifications through final inspection. Experience, "know-how", up-to-the-minute production methods and equipment, of course, play their important part in producing Accurate quality and service. By combining its special knowledge with that of your own engineers, Accurate can help you whip problems before they occur.

We know you will like Accurate cooperation. It gets you what you want when you want it. Send your specifications or ask to see an Accurate engineer.

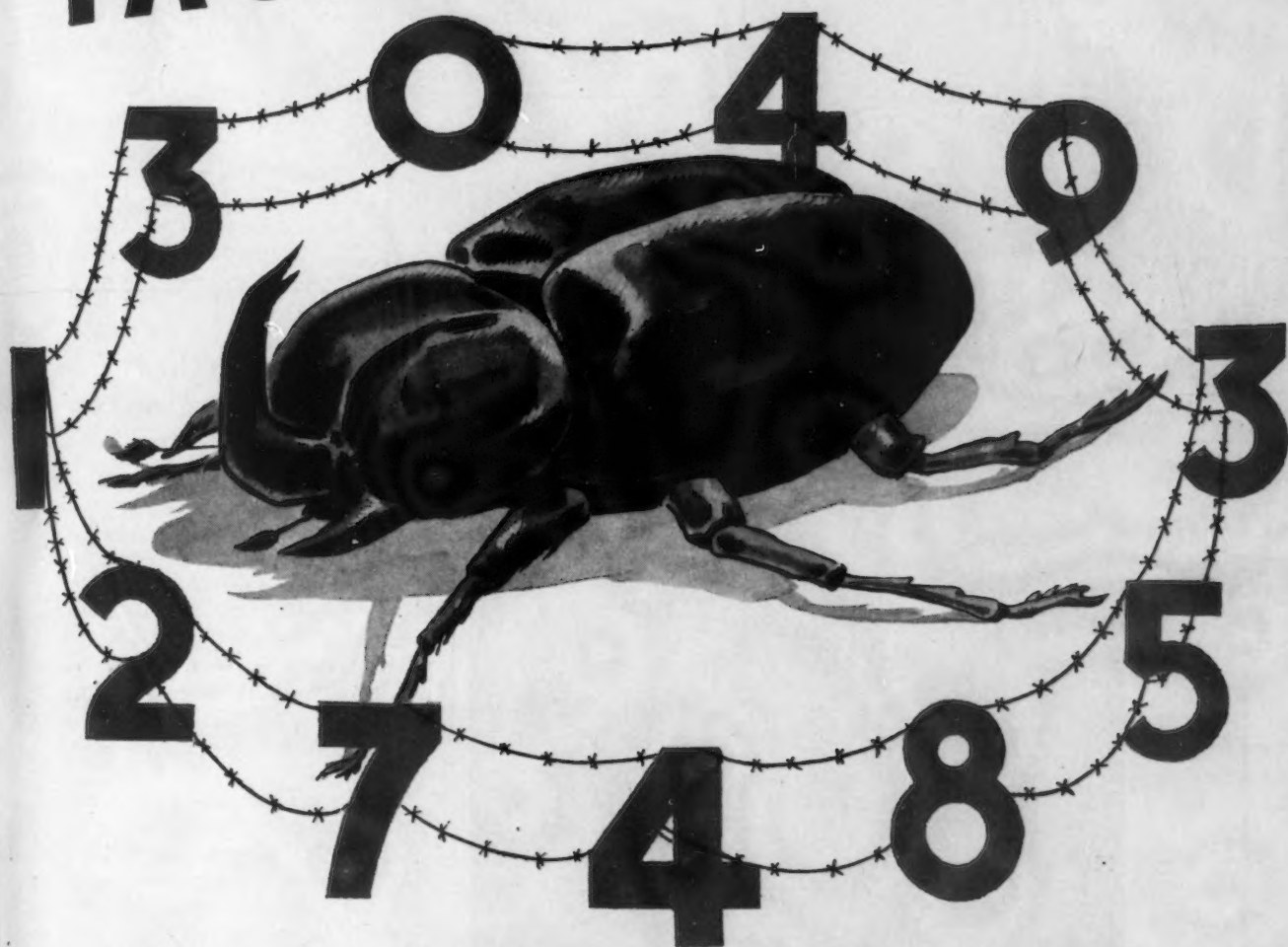
Send for the new Accurate "Hand Book of Technical Data."



**SPRINGS
WIREFORMS
STAMPINGS**

**ACCURATE
SPRING MFG. CO.**
3819 W. Lake St.
Chicago, Ill.

Fence him off with FACTS·IN·FIGURES

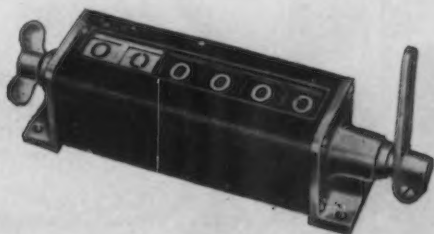


There's not any room, today, for bugs in war production. Not even for the simple, routine bugs that only call for quick machine-adjustments. And particularly not for the japanese beetles and german plant lice of deliberate sabotage.

But there's room . . . *in fact, there's a definite place . . .* on every production machine for a Veeder-Root Counting Device that will put the finger on all kinds of bugs, as soon as they show themselves, and keep them from working

into the danger zone. It's easy, quick, and inexpensive to give machines this protection . . . without disturbing schedules. And then you will have them equipped for effective *counter espionage*", so that they can warn your production men at the first sign of attack from any quarter. If your machines count heavily in the war effort, then you can count on Veeder-Root to help you, *right now*.

Veeder-Root Incorporated
HARTFORD, CONN.



Ordering Y Components Clarified

Washington

• • • A jobber or distributor desiring to procure critical common components in the Y classification under General Scheduling Order M-293 from a manufacturer for stock or resale is the proper person to request from the WPB authorization to order such

an item, WPB pointed out recently.

Order M-293, as amended April 21, 1943, dealing with critical common components, provides that none may place an order with a manufacturer, and no manufacturer may accept an order, for any Class Y critical common component unless accompanied

by specific WPB authorization. Class Y critical common components include such items as industrial type instruments, marine fitting hardware, certain types of compressors and dry vacuum pumps and heat exchangers.

WPB has received numerous requests asking whether or not jobbers or distributors are the persons to file the designated form for the purchase of Class Y components, under the terms of Order M-293. As a result, Interpretation 1 of the order has been issued to answer these inquiries.

If the jobber or distributor, at the time he files an order, knows the customers to whom the item will be resold, he must furnish the name and such other requested information regarding the customer as may be available.

Reg. 5 Not to Be Used For Production Welding Rod

Washington

• • • Welding rod used for manufacturing purposes may not be treated as an operating supply under CMP, the WPB announced Saturday, even though it is carried as an operating supply under the manufacturer's established accounting practice.

This ruling is contained in Direction No. 7 to CMP Regulation No. 5, which says that welding rod includes both arc welding electrodes and gas welding rods.

The direction states that a manufacturer may use ratings assigned to him by CMP Regulation No. 5 for MRO, to obtain his requirements of such rod to repair his own equipment. However, such ratings may not be used to get welding rod for welding operations in the production of a product.

P-Orders for Shipyard Construction Are Revoked

Washington

• • • Preference Rating orders P-14-a and P-14-b, under which Maritime Commission shipyards were given preference for the purchases of materials in constructing shipways and other facilities were revoked last Friday by WPB. Hereafter, materials for the construction of shipyard facilities will be obtained by use of form WPB 617, formerly PD-200.

Order P-14-a originally governed applications for materials on projects to be completed in 1941 and P-14-b was used for projects to be completed in 1942. This year, the orders were virtually interchangeable.

ARMSTRONG



"That extra tank, that ship, that plane"—can come from the unused capacity of most shops.

Even today when our most important job is to make every machine-hour and man-hour produce more, many shops are still content to operate machine tools at "standard" speeds and feeds. In most cases on lathes, planers, slotters and shapers these so-called "standard" cutting speeds are carry-overs from the old forged tool days, are in no way indicative of the productive capacity of machine tools equipped with modern ARMSTRONG TOOL HOLDERS. If you are having trouble getting out your part of the war load, are "short" of either men or machine tools, you may find the answer to your problems in higher speeds and feeds. See that you have the correct ARMSTRONG TOOL HOLDER for each operation, then speed up, not only to the first "vibration point" but often beyond it where you will find new free cutting speeds that can greatly increase (often double) hourly production. Remember, your ARMSTRONG TOOL HOLDERS will stand up to any output a machine tool can attain.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

309 N. FRANCISCO AVE., CHICAGO, U. S. A.

Eastern Warehouse & Sales: 199 Lafayette St., New York



ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms



DO YOUR CONTRACTS CALL FOR BRASS AND BRONZE CASTINGS *IN A HURRY?*

★ ★ ★ If you need sand castings in a hurry we can help.

Our modern foundry can be placed at your service immediately for the manufacture of brass or other copper base alloy sand castings.

Ample capacity and the latest equipment PLUS experienced men who have the "know how" for the production of close tolerance work will assure you of uniform high quality castings with close grain structure.

We can furnish castings rough, machined, polished or plated. Our own Tool Room and Pattern Shop are ready to turn out any necessary tools or patterns if your job is in the blueprint stage. We manufacture a standard line of valve bodies of all kinds — STREAMLINE pipe fittings for heating, air conditioning, water works, plumbing and refrigeration use — OR TO YOUR OWN SPECIFICATIONS.

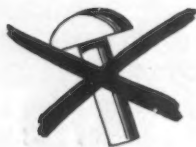
If you need castings in a hurry — WRITE US NOW.

MUELLER
BRASS CO.
PORT HURON, MICH.



Helping to Solve Today's Wartime Production Problems

THE SCIAKY PROCESS OF ELECTRIC RESISTANCE WELDING IS MAKING
THESE VITAL CONTRIBUTIONS TO OUR MIGHTY FLOW OF WAR GOODS



SAVING PRECIOUS MATERIAL

by replacing costly riveting methods on many assemblies, spot welding is responsible for saving large quantities of critical metal. Better welding methods mean less rejects and scrap. In addition, the Sciaky method enables two or more machines to operate from the same rectifier, thus saving scarce equipment.



SPEEDING PRODUCTION

As many as 80 spot welds per minute on two thicknesses of .040 light alloy! Primary and secondary assemblies, as well as non-structural parts are being spot welded with speed and precision. The use of extremely short weld timing and precise control of energy make possible this high speed.



LOW POWER NEEDS

The extremely high current requirements for welding aluminum alloys and consequent heavy expense involved for the installation of special conducting equipment, are eliminated by the application of the Sciaky "Stored Energy" principle. Ordinary current is rectified and stored before release to the electrodes.



STRONGER, SOUNDER WELDS

are effected by the Sciaky patented Variable Pressure Cycle. Precompression to establish perfect contact is followed by a reduced pressure during the welding surge, and finally a recompression which "forges" the metal. A preheating feature makes possible stronger welds by reducing stresses.



NO SKILLED OPERATORS

Once the proper pressure, current and timing has been set, the operation (by a convenient foot switch) is fully automatic. The settings are easily made on the sequence panel by the adjustment of the maximum current relay and the pressure gauge.



LESS MAINTENANCE

Simplicity of diagram reduces maintenance problems. The control cabinet is hinged and the entire sequence panel may be removed. Routine contactor maintenance may be made by an ordinary electrician. The Sciaky machines are sturdily built, quickly installed and easily qualified.

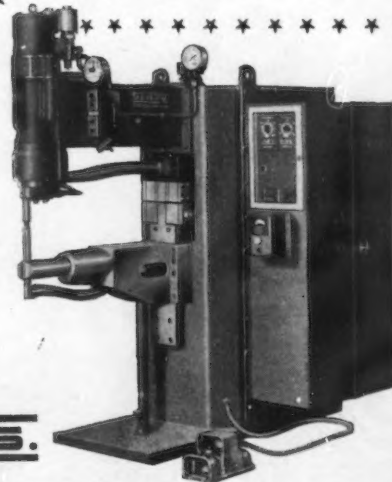


left

TYPE PMCR.2516 SCIAKY ELECTRIC RESISTANCE ROCKER ARM WELDER, welding 70 spot welds per minute, on two sheets of aluminum alloy of .040" each. Welding capacity from two thicknesses of .016" in aluminum alloys up to and including .080".

right

TYPE PMCO.2516 SCIAKY ELECTRIC RESISTANCE WELDER, 80 spot welds per minute on two sheets of light alloy of .040" each. Welding capacity from two thicknesses of .016" each in light alloys up to .091".



SCIAKY BROS.

4915 WEST 67th STREET • CHICAGO, ILLINOIS

ARMY

E

NAVY

Awarded to Houdaille*

NO enemy, no combination of enemies can ever match this country's ability to produce better weapons of war, in overwhelming quantities—*lightning-fast!*

Already American mass-production has doomed the Axis.

Here is just another proof of it: The coveted Army, Navy "E" has been awarded to the employees of Oakes Products Division, Houdaille-Hershey Corporation, "for outstand-

ing achievement in producing war equipment."

We take this means of letting the readers of IRON AGE know about it—not as a matter of vanity, but as deserved tribute to our own co-workers, and to the wonderful men and women on vital production lines, throughout all American industry, who, every hour, are bringing the day of victory nearer and nearer.



HOUDAILLE-HERSHEY CORPORATION

General Executive Offices, Detroit, Michigan

PLANTS AT: Buffalo, N. Y. ★ Cheektowaga, N. Y. ★ Jackson, Mich. ★ Detroit, Mich. ★ Chicago, Ill. ★ Decatur, Ill. ★ North Chicago, Ill. ★ Muskegon, Mich. ★ Oshawa, Ont., Can.

HOUDAILLE'S PEACETIME PRODUCTS: Houdaille Hydraulic Shock Absorbers for Automotive, Railway and Industrial Equipment ★ Bumpers and Grille Guards ★ Ignition Locks ★ Brake Levers ★ Air Cleaners ★ Crankshafts and Camshafts for Aircraft, Automotive and Marine Engines ★ Aircraft Landing Struts and Shimmy Dampers ★ and many other precision-made parts for the Automotive, Aircraft, Electrical Refrigeration, Radio and other industries.

*Pronounced "HOO-DYE"

CLARK

BOLTS

NUTS

SCREWS

RIVETS

as

American

as an
Indian

STAMINA-

and
100%

on the Warpath

CLARK BROS BOLT CO.

MILDDALE, CONN.

SINCE

1854

NEWS OF INDUSTRY

Delayed Shipment Ruling Clarified

Washington

• • • WPB announced last Friday that a steel producer must notify his customer as soon as it is learned that delivery cannot be made in the month requested. The producer must also notify WPB in writing as soon as he determines that shipment can not be made within 30 days after the requested month.

These requirements, provided in Direction 18, as amended, to CMP Regulation No. 1, change the previous rules, under which such notice was required only when the producer actually failed to make shipment.

The amended direction also collects into one document existing regulations relating to acceptance of steel orders under CMP. All have previously been announced through directions and letters to the industry.

Dollar Prices Set On Reusable Storage Tanks

Washington

• • • Specific maximum prices for reusable steel storage tanks, field assembled, were announced by OPA.

For reusable steel bolted storage tanks, dollars-and-cents prices "per tank" are provided for those various capacities.

For reusable steel riveted and welded tanks, dollars-and-cents "per ton" prices are established.

In the case of reusable steel storage tanks with floating or balloon roofs and reusable steel tanks of spherical shapes, sellers are given a procedure for submitting a proposed price to OPA for approval.

The new specific prices are established in Maximum Price Regulation No. 411 and become effective July 2, 1943.

Brass Mill Order Extended Indefinitely

Washington

• • • Direction No. 4, under CMP Regulation No. 1, covering production of orders by brass mills, was amended last Friday by WPB to make it applicable indefinitely. As originally issued the direction did not cover production or orders for delivery beyond June. The program symbol N 1, heretofore used to cover certain ammunition programs, has been changed to N 4 in the amended version.

THIS BULLETIN

EASY-FLO RINGS



tells you how to speed up your brazing with *preplaced* EASY-FLO RINGS

The method of brazing terminal tubes to steel enclosures, switch boxes, lighting fixtures and other terminal boxes, with rings of EASY-FLO silver brazing alloy wire preplaced, is now virtually standard on construction of these units for marine service where strength, leak-tightness and fast production are paramount.

The EASY-FLO RINGS bulletin gives full details about the method and full instructions for applying it. And while it deals specifically with enclosures, the bulletin is very much of interest to all manufacturers because the same method can be used to equal advantage on a wide range of other ferrous and non-ferrous metal brazing operations.

Preplacing EASY-FLO Rings substantially speeds up production and gives close control of the amount of alloy used.

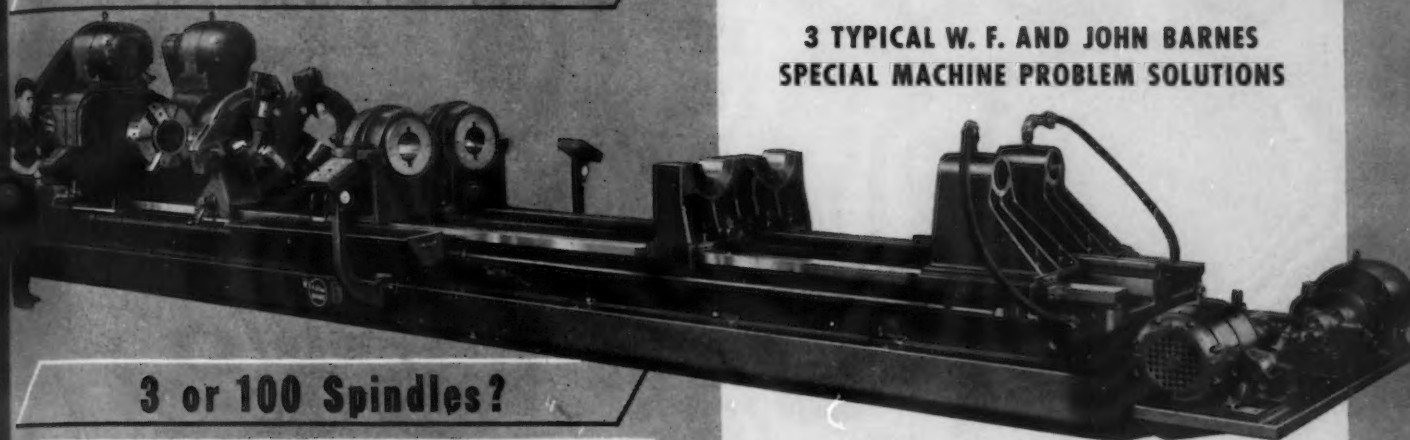


WRITE FOR A COPY
OF THE EASY-FLO
RINGS BULLETIN —
TODAY

HANDY & HARMAN
82 Fulton St.
New York 7, N. Y.
Agents in Principal Cities
HANDY & HARMAN of Canada, Ltd., Toronto.

WHAT SIZE MACHINE TOOL DOES *Your* PART REQUIRE?

1-Foot or 15-Foot Stroke?



3 or 100 Spindles?

1 or 7 Multi-Spindle Heads?

**3 TYPICAL W. F. AND JOHN BARNES
SPECIAL MACHINE PROBLEM SOLUTIONS**

12-Foot Stroke Two-Spindle Deep Hole Cylinder Boring Machine

This special machine, designed for boring the inner and outer cylinders of airplane landing struts, was completely assembled and tested on our new assembly floor before shipping. Maximum length of part is 67". Five different diameters varying from 8.344"/8.282" to 11.000" are bored using Tungsten Carbide Tipped Tools. Write for new bulletin 445C describing this machine.

★ The usual factors governing the design of a special machine to suit your part are its size, shape, material, required operations, and required production. Obviously, when the part requires unusually large equipment, the machine designer and manufacturer must, in addition to engineering experience and skill, have sufficient *manufacturing and assembly capacity.*

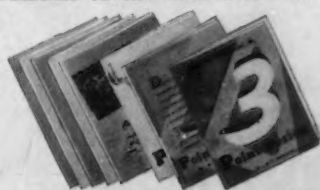
As specialists in machine designing for both low and high production, W. F. and John Barnes Company has both the experience and capacity to build machines to suit most any part regardless of size. Their large, spacious plant is equipped with machines of capacity to machine the long heavy beds and other component parts required for large machines, and has ample assembly space for erecting and testing the equipment before shipment.

Experienced Engineers Available to Assist in Tooling

No matter what your product or your machining problems, if your manufacturing includes drilling, boring, milling, tapping or honing, you may find it profitable to use the W. F. and John Barnes Machine Design Service. Experienced engineers, familiar with processing methods, will analyze your problem, without obligation, to determine the most productive machining sequence. Just send part prints and production requirements for a preliminary estimate.

THESE 8 FREE BULLETINS WILL SHOW YOU HOW TO USE THIS MACHINE DESIGN SERVICE TO SOLVE YOUR MACHINING PROBLEM

Get these 8 bulletins today. Each traces a machining problem from the original production requirements to the final machine design. Each may suggest a tooling or production set-up that you can use today — valuable file information for tomorrow. Ask for bulletins 643.



Multi-Head 21 Spindle Drilling Machine



This multi-head special machine drills, faces, countersinks and taps the crankcase blower section of an aircraft engine. It has six machine units with a total of 21 spindles. This part

was formerly drilled on standard single spindle drilling equipment and tapped by hand.

Special Facing Machine

This small machine further illustrates the ability of W. F. and John Barnes to design a machine, large or small, to suit a specific job. This machine was designed for a prominent washing machine manufacturer to face two bosses in a small cast-iron housing.



W. F. and JOHN BARNES

335 SOUTH WATER STREET • ROCKFORD, ILLINOIS, U.S.A.

Steel Warehouses Aided by Amendment

Washington

• • • Restrictions on steel fabricators who have done only a limited warehouse business were relaxed last week by the WPB. Under the new procedure, established by General Preference Order M-21-b-1 as amended, the provision which required that at least 25 per cent of a fabricator's business be of a warehousing nature before he could qualify as a warehouse no longer applies.

Also under the amended order, the substantial number of small distributors who stock no steel products except drill rod and tool bits are authorized to continue such operations without getting a warehouse certificate, the PD-83-b form under Order M-21-b or the PDL-228 form under CMP.

Another change in the revised order makes quantity restrictions on product groups more flexible for small warehouses. The restrictions on these firms now are based on type, such as carbon steel, rather than individual

product, such as hot rolled carbon bars.

Provision also is made for purchases for stock by one warehouse from another, using Form CMP 11 to cover inter-warehouse transactions. Such operations, however, are subject to the quality limitations imposed by CMP Regulation 4, on sales of controlled materials by warehouses and dealers to consumers. The amended order is effective July 1.

Blaw-Knox Signs Navy Renegotiation Agreement

Pittsburgh

• • • Blaw-Knox Co. has signed an agreement with the Navy Price Adjustment Board, covering renegotiation of its war contracts.

The agreement calls for the re-funding of \$4,500,000 to the Government during 1943, in settlement of renegotiation for all periods to December 31, 1942.

Briefly Told— New Zealand Making Sten Automatic Gun; Other Industry News

• New Zealand has placed the Sten automatic gun in production, according to an official statement. It involves 500 separate operations in manufacture, but has relatively few parts. It is being made for European standard size of bullets.

• Another step in tool conservation and salvage is the making of counterbores from broken double-end mills. In most cases two counterbores are made from each broken tool. In making the counterbores, the end mill is first annealed, then cut in half. Each part is then mounted in a lathe and a pilot machined. The counterbore is then backed off and re-hardened. Reamers and drills can be reclaimed in a like manner. The above is the practice at the Mansfield works of Westinghouse Electric & Mfg. Co.

• W. W. Coleman, chairman of the board of the Bucyrus-Erie Co., South Milwaukee, Wis., recently presented gold watches to three employees who had each worked for the firm 50 years. The men honored were Marion E. Gladfelter and Max. J. and Otto A. Dinkelman, brothers. They joined the firm when it was located at Bucyrus, Ohio.

• Milwaukee Industrial Advertisers' Association elected the following new officers: President, R. C. Freitag, Briggs & Stratton Corp., Milwaukee; vice-president, F. M. Higgins, Four Wheel Drive Co.,

Clintonville, Wis.; secretary and treasurer, William H. Menclilly, Cleaver Brooks Co., Milwaukee; and G. A. Smith, Snap-On-Tool Co., Kenosha, Wis.

• The value of war industrial facilities financed with public and private funds reached \$19,339,000,000 by the end of March, WPB reported recently.

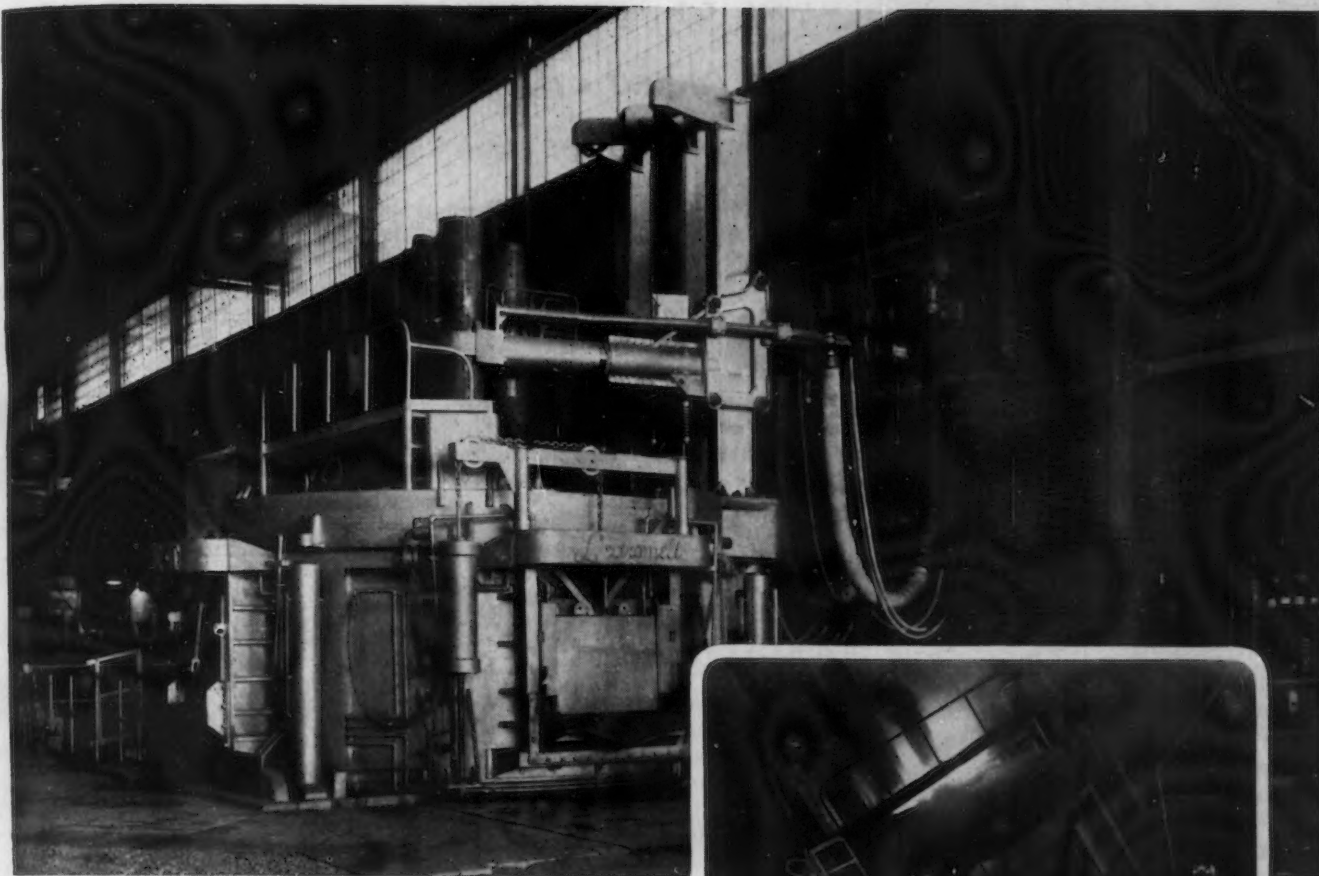
• A plan designed to boost the morale of former employees now in the armed services was disclosed by the Cooper-Bessemer Corp., Mount Vernon, Ohio. With over 600 workers in the armed forces, the name, rank, address, and birth date of each employee in the armed services is recorded and kept up to date. A personal birthday message is sent to each individual from B. B. Williams, chairman of the board. Those stationed within the United States receive a carton of cigarettes with each birthday card, and those on overseas duty also receive a suitable gift from the company.

• The Quaker Chemical Products Corp., Conshohocken, Pa., recently held a war show designed to acquaint the personnel with the importance of their work as a part of the national war effort, and to create interest and pride in the combatant equipment they are building. Guest speakers included two men who had seen action in North Africa and the Pacific. Official Army and Navy films were also shown.

Greater Tonnage
Per Edge of Blade



AMERICAN
SHEAR KNIFE CO.
HOMESTEAD, PENNSYLVANIA



**50-ton Capacity
Top Charge Type**

Rugged Simplicity—

Simplicity and ruggedness characterize the LECTROMELT furnace. Eliminated is the nuisance entailed by the use of complicated operating mechanisms. Parts subjected to the greatest stress are accurately proportioned, extra strong and are made durable by the use of proper treatment.

The illustrations show one of the largest top charge type electric furnaces in the United States in normal operating position and also pouring a heat. It is a 17

foot diameter, size KT, 50 ton capacity LECTROMELT. In this furnace both a main working door and an auxiliary side working door are provided for convenience in working heat.

Top charge furnaces are built in capacities ranging from 100 tons down to 250 pounds. They all give increased tonnage per man hour, lower power consumption and savings in electrodes and refractories. Write for complete information on LECTROMELT FURNACES to meet your melting requirements.

MOORE RAPID
Lectromelt
FURNACES

**PITTSBURGH LECTROMELT FURNACE CORP.
PITTSBURGH, PENNSYLVANIA**

New Plan Outlined to WPB Aimed at Redistributing Idle or Used Machines

Washington

• • • The Used Equipment and Machinery Industry Advisory Committee, meeting with War Production Board officials here, was given an outline of a new and improved program for the redistribution of idle and used equipment and machinery.

The need for such a program was traced to the continued drain on essential war materials requested for production of new machinery and equipment, the disinclination of purchasers to use second-hand machinery, and the lack of adequate means of locating, inventorying and redistributing the large stocks of idle machinery and equipment in existence.

Basically, the plan is built around the use of the facilities of the 4400 licensed used equipment dealers to locate, rebuild and negotiate sales of used equipment.

These dealers normally own at any one time approximately 15 per cent of existing used equipment, and have a knowledge as to the location of about 55 per cent more. They are asked to report on all items of which they have any knowledge instead of only those which they own, as formerly reported to OPA on Form 2:01:P1 under the terms of OPA Maximum Price Regulation 136.

Their activities in this respect are to be supervised and assisted by the field personnel of the War Production Board assigned to that duty. These

field representatives will augment the collected data by obtaining reports on a voluntary basis from the users, constituting the remainder of the total.

Under the plan, the WPB Redistribution Division will establish policies and procedures to facilitate the locating, inventorying and redistributing of all items of idle and excess machinery and equipment. The division is charged with the duty of assuring the collection of lists and the maintenance of inventories of the machinery and equipment of all WPB regional offices for those items to be handled at the regional level and in Washington either in the division's Used Machinery and Equipment Branch or in the various industry divisions, of items in all regions.

In the future, requests for new equipment will be screened to determine the availability of used equipment as a suitable substitute. This screening is to be decentralized to

all regional offices as far as possible.

The WPB industry divisions will continue to have the responsibility of approving applications for new production after the screening against the inventories of used equipment at the regional level, and if unavailable there, at the national level in the inventory records at Washington.

Lincoln Foundation Papers to Be Published

Cleveland

• • • New information on arc welding of great interest and value in war production and with many extremely important peacetime applications is soon to be made available by the James F. Lincoln Arc Welding Foundation in the form of a 1200-page book entitled "Studies in Arc Welding," containing 98 of the outstanding award studies submitted in the foundation's 1940-1942 Industrial Progress Award Program, according to announcement made by the foundation.

New Mills for Alloy Steel Being Installed by Follansbee

Pittsburgh

• • • Follansbee Steel Corp. is now installing a 14-in. roughing and a 12-in. finishing merchant mill for the rolling of alloy and tool steel rounds, squares, hexagons, octagons, and flats in sizes from 3/4-in. to 3 1/2-in. Four by four billets have been the minimum size produced at this plant in the past.

The company has an annual ingot capacity of more than 125,000 tons of high grade alloy steels.

Priority Changes

L-126—Schedule 3, as amended, permits the use of seamless steel tubing in the manufacture of finned coil or tube assemblies as part of refrigerating equipment. (6-26-43)

L-225—Amended order places additional restrictions on the manufacture and installation of rigid electrical conduit, electrical metallic tubing, flexible metal conduit or tubing, and raceways to effect further savings in steel. (6-24-43)

L-268—Amended order removes "case and bezel or slip ring of pressure gages" from the list of parts in which the use of non-ferrous metals or stainless steel is prohibited. The deleted items are covered in order L-272. (6-22-43)

L-280—Amended order deletes the former provision requiring all manufacturers of fans and blowers to file monthly detailed delivery schedules. (6-21-43)

M-1-d—Amended order provides more precise rules for the distribution of aluminum scrap derived from aircraft wreckage and ship repairs. (6-26-43)

M-9-c-4—Amended order expands the list of copper and copper base alloy building materials which civilians are not permitted to use. (6-24-43)

M-45—Revoked. (6-22-43)

M-233—Int. 1 points out that a preference rating for maintenance, repair and operating supplies may not be used to obtain a gas cylinder from manufacturers whether the user carries his gas cylinders as operating supplies or as capital equipment. (6-25-43)

Priorities Reg. 18 has been amended to freeze the production schedules of certain manufacturers. (6-25-43)

Price Briefs

• Max. Price Reg. 408 stabilizes distributors' maximum prices for brass mill products and services at October, 1941, levels and permits the continuation of distributors' mark-ups over mill prices existing at this time up to 3c. a lb. on all items except pipe or water tube. The regulation becomes effective July 19, 1943. (Release No. OPA-2691)

• Amendment 92 to Reg. 136 modifies the provisions of Amendment 78 so that they are applicable to wholesalers as well as manufacturers and suppliers of machinery. (Release No. OPA-2692)

• Amendment 6 to Revised Max. Price Schedule 41 establishes maximum charges producers may make for machining steel castings in connection with their sale on a March 31, 1942, base. (Release No. OPA-T-1055)

• Amendment 93 to Max. Price Reg. 136 provides that lessors are required to submit a proposed maximum rental rate and certain descriptive data to OPA.

CMP Developments

• Direction 10 of Reg. 2 eases restrictions on the acceptance of deliveries of alloy steel airframe and engine tubing so that manufacturers of such products can make the fullest use of their facilities. (Release No. TCS-91)

• Producers of rail anchors will continue to operate under production directives during the third quarter of 1943. Beginning with the fourth quarter they will operate under CMP Reg. 8. (Release No. CMPL-320)

• Gage rods, mine ties, clip bolts, rail clips and nut locks are now classified as controlled materials and producers will obtain their requirements for the third quarter as they have previously. Beginning with fourth quarter these items will be classed as B products. (Release No. CMPL-319)

• Amendment 1 to Direction 2 of Reg. 5 specifies that steel wire is the only kind of wire used in making footwear which may be treated as an operating supply under CMP. (Release No. TCS-162)

Dollar and Cent Price Levels Set for Ferromanganese and Alloys

Washington

• • • Specific dollars-and-cents maximum prices for ferromanganese and manganese alloys and metals were announced Monday by OPA.

The new specific ceilings are contained in the Revised Maximum Price Regulation No. 138 and become effective July 1 in order to conform with the industry practice of making price changes on the first of a calendar quarter.

The revised regulation, besides providing dollars-and-cents ceilings for standard ferromanganese, with specific differential to cover crushing and grinding, establishes specific maximum prices for substandard ferromanganese, electric furnace ferromanganese, spiegeleisen, silicomanganese, and manganese metal previously covered by the General Maximum Price Regulation. The prices provided in the new revised regulation are essentially the same as those previously in effect.

New Prices Set On Basic Refractories

Washington

• • • Basic refractory brick, dead-burned dolomite, dead-burned grain magnesite, and kindred basic refractory products used in the masonry linings of metallurgical and industrial furnaces were placed under a separate price regulation Monday by OPA. Price levels, which have undergone no change since September and October 1941, are not altered by the action although specific dollars and cents prices replace "freeze" prices.

The commodities are brought under Maximum Price Regulation No. 416, effective July 3.

Giant Locks Completed; To Permit Capacity Ore Loads

Cleveland

• • • The MacArthur Lock, completing the battery of four giant locks on the St. Mary's Falls canal at Sault Ste. Marie, Mich., will be turned over by the contractor to the federal government on Sunday. Following a week of testing, the new lock will be put into service July 11, permitting the 21 supercarriers of the ore fleet to load to their maximum of 24 ft. Because of exceptionally high water,

the boats have been able to load to 23½ ft. this season, but 22 ft. is normal.

Concrete for the lock was poured during the severely cold winter in areas covered by great heated structures. Cost of the lock and its approaches off the canal is more than \$14,000,000.

Forward Allotments Are Termed Problem

Detroit

• • • The problem of forward allotments is the most bothersome one confronting industry today in the employment of the Controlled Materials Plan, R. A. Whitney, deputy CMP chief, stated in an interview here. Efforts are being made to extend forward allotments as rapidly as possible, he said.

He expressed the belief that as CMP becomes more and more efficient it will be possible to cut the present 60-day inventory restriction to a still shorter term. He explained that as companies become more and more sure of obtaining their requirements, there will be continually less desire for maintaining inventories. At the same time he said that in cases of special hardship or specific problems, companies could obtain exceptions from the 60-day limit in order

to build up inventories to whatever level might be required in such cases.

Companies are having some difficulty obtaining steel from warehouses, because of the general depletion of warehouse stocks. Whitney indicated that steps are being taken to solve this problem. (Later he told a meeting that CMP Reg. 4, dealing with warehouses, would soon be reissued.)

Industry's problems are being canvassed by Whitney and other CMP officials in a series of meetings throughout the country, coupled with visits directly to prime and subcontractors. The present swings around the country by several crews will have visited more than 500 war producers for detailed discussions of their CMP problems.

National Tube Completes World's Largest Oil Line

Lorain, Ohio

• • • Production of the world's largest oil line has been completed in record time at the Lorain pipe mills of the National Tube Co., and the last train load of the "Big Inch" has gone to its destination along the route of the 1272-mi. petroleum line extending from Texas to the East Coast.

Manufacturing the 24-in. line for War Emergency Pipelines, Inc., this United States Steel Corp. subsidiary plant since last July produced 280,106 tons of seamless steel pipe for the line through which 300,000 bbl. of oil will flow daily.

FOR UNUSED ALLOTMENTS: This is the form to be used for returning unused allotments to WPB. Thus your unused allotments can be reallocated to those needing them. The return is made to WPB and it is not necessary to notify the original source of your allotment of the return. Allotments returned prior to June 25 should not be included in the unallotted balance shown on the form.

FORM WPB-3029 (6-20-43)		UNITED STATES OF AMERICA WAR PRODUCTION BOARD		BUREAU OF THE BUDGET NO. 12-43560 APPROVAL EXPIRES JULY 31, 1943		
CMP ALLOTMENT ACCOUNTS' STATUS REPORT AND RETURN OF UNUSED ALLOTMENTS (FOR 3RD QUARTER, 1943 ALLOTMENT ACCOUNTS ONLY)				SHEET OF SHEETS		
				NAME OF CONSUMER		
TO: War Production Board, Washington, D. C., Ref: WPB-				ADDRESS (Street, City, State)		
CODE NO		CONTROLLED MATERIAL				
UNIT MEASURE		DESCRIPTION (FORM OR SHAPE IN WHICH ALLOTMENT MADE)				
<p>Prepare in triplicate (3). Retain one (1) copy for your files. To be prepared as of June 25, 1943 and returned to the War Production Board, Washington, D. C., Ref. WPB-3029, not later than July 5, 1943.</p>						
DISPOSITION OF UNALLOTTED BALANCE						
DO NOT USE	MAJOR PROGRAM SYMBOL	ALLOTMENT RECEIVED	UNALLOTTED BALANCE	TO BE PURCHASED	TO BE REALLOTTED	RETURNED HEREBY FOR TRANSMITTAL BY WPB TO APPROPRIATE CLAIMANT AGENCY
	(a)	(b)	(c)	(d)	(e)	(f)

PERSONALS

• **William P. Woodside** has resigned his post as vice-president in charge of research of the Climax Molybdenum Co., New York. Mr. Woodside has spent the past half century, actively, in the steel industry and from now on he intends to spend the major portion of his time on his farm located in Oakland County, Mich. He is still retaining his interests in Park Chemical Co., and American Twist Drill Co. being chairman of the board of both companies. Mr. Woodside joined Climax Molybdenum in 1926 and, largely through his influence, the research laboratory of the company was established in 1931 under his supervision as director of research. **Alvin J. Herzig** will take over Mr. Woodside's duties while still retaining his position as chief metallurgist.

• **Harry L. Smith** has been appointed vice-president and general sales manager of Kelite Products, Inc., Los Angeles. Mr. Smith, who has been with Kelite since 1937, formerly covered the entire country as a "trouble shooter," visiting plants where new or difficult cleaning problems were encountered. He returned early in June from an extended visit to Eastern war centers where he and J. H. Hart, Kelite chief chemist, studied cleaning operations in the aircraft factories. **Bruce Wiswall** has been placed in charge of the engineering division with the responsibility of providing blueprint and instruction data on cleaning methods developed for special war production needs. The following have also been appointed: **M. L. Forsberg**, midwest regional manager; **C. L. Gilmour**, southern California regional manager; **Leon Alexander**, general manager, Houston, Tex.; **Lyle Harbour**, Arizona-New Mexico regional manager; **R. F. Medanich**, northern California regional manager; and **Ernie Seversen**, North West regional manager.

• **John A. Bennan**, former president, was elected chairman of the board of Jefferson Electric Co., Bellwood, Ill. **J. C. Daley** was elected president and treasurer, and **A. E. Tregenza**, executive vice-president. The following were named: **James M. Bennan**, vice-president and general sales manager; **A. A. Flick, Jr.**, vice-president in charge of manufacturing; and **R. A. Hoagland**, vice-president in charge of war contracts. Four executive engineers were appointed: **E. G. Goddard**, commercial products; **R. J. Horst-**



WILLIAM P. WOODSIDE, who has resigned his position as vice-president in charge of research of the Climax Molybdenum Co.

mann, radio and electronic products; **L. Mauerer**, design and development; and **E. W. Rickmeyer**, mechanical products. **E. J. Banigan** was appointed director of purchases, and **H. F. Tobler** was made personnel director.

• **John E. Mateer**, since July, 1940, assistant superintendent of the open hearth department of Lukens Steel Co., Coatesville, Pa., has been appointed superintendent of that department. Mr. Mateer succeeds **Herman J. Hofmann**, who has resigned because

JOHN E. MATEER, open hearth superintendent, Lukens Steel Co., Coatesville, Pa.



of his health. Mr. Hofmann will occupy the position of open hearth adviser. Mr. Mateer started his career as a steel worker in 1907, as a door boy in the open hearth department at Lukens. In his subsequent 36 years of service, he worked successively as second helper and first helper becoming a melter in 1918, and melter foreman in 1927. In July of 1940 he was made assistant superintendent of the open hearth department.

Mr. Hofmann entered the employ of Carnegie-Illinois Steel Corp. in Donora, Pa., in 1904, as weighmaster in the transportation department, and later filled various capacities in the rolling mills and operating departments. In 1915 he joined the Donner Steel Co. as turn foreman in the rolling mills. He later transferred to the open hearth department of which he ultimately became foreman. In 1928 he became assistant superintendent of the open hearth department of Lukens Steel Co., advancing to superintendent in July of 1940.

• **D. Reeder**, executive of the Electro Metallurgical Sales Co., formerly in the Chicago office, is now at the San Francisco office.

• **Colonel F. M. Smith**, formerly regional director of the WPB salvage division at San Francisco, has been appointed regional director for the Smaller War Plants Corp. in the same city.

• **George O. Rowland**, an executive of Osborn Mfg. Co., Cleveland, has been appointed chief of the WPB's industrial brush unit, Washington.

• **Charles E. Sorensen**, vice-president of the Ford Motor Co., has been named to the Board of directors of the Automotive Council for War Production. Mr. Sorensen takes over the post left vacant by the death of Edsel B. Ford.

• **Harry A. Bossi**, representing H. C. Macauley Foundry Co., Berkeley, is the new president of the Northern California Chapter, American Foundrymen's Association. **Ralph C. Noah** of the San Francisco Iron Foundry is vice-president.

• **Albert A. Bertrand** has been appointed superintendent of night operations at the East Springfield plant of Westinghouse Electric & Mfg. Co. A veteran of 24 years' experience at Westinghouse, Mr. Bertrand started to work for the company in 1925 as a fan assembler, and later was transferred to the small motors department as a group leader. Shortly after the

plant began to manufacture refrigerator compressors in 1931 he was assigned to this new activity as a group leader. He later was promoted to posts of assistant foreman and foreman and became general foreman in 1941.

- **Norbert J. Brennan** has been appointed director of traffic for Chrysler Corp., replacing N. D. Hoke, who died recently. For the last six years he was assistant to Mr. Hoke. Before that he was with the New York Central Railroad.

- **J. Harold Bumby**, formerly mayor of Ripon, Wis., and secretary-treasurer and sales manager of Advertisers' Mfg. Co. there, has been elected president of the MacGillis & Gibbs Co., Milwaukee.

- **Harold E. Long**, who has been with the Nash organization at Kenosha, Wis., since it was founded in 1917, has been appointed works manager of the Kenosha Nash-Kelvinator plant.

- **Harry W. Lundin** has been appointed director of the safety and plant protection section, department of industrial relations, Monsanto Chemical Co., St. Louis. Mr. Lundin was formerly district engineer for Chicago territory of Liberty Mutual Insurance Co., Boston.

- **John Hardman Logan** was elected vice-president of Visible Index Corp., New York, recently. Mr. Logan will retain his duties as treasurer in addition to assuming those of vice-president. Mr. Logan was formerly vice-president of Bondex, Inc., financial consultants.

- **P. J. Flaherty**, president of the Johnson Bronze Co. since its organization in 1914, has been elected chairman of the board of directors. **J. Preston Flaherty**, his son, succeeded him as president but will retain his present post of treasurer also.

- **F. Marion Willis** has been elected president of R. F. Willis & Bro., Inc., Penn's Grove, N. J. Mr. Willis was formerly treasurer and general manager. **William J. Brodesser**, formerly secretary and sales manager, has been elected vice-president.

- **Ray E. Palmer** has been made manager of the Boston office of the Aluminum Co. of America to succeed Gordon W. Cameron. Mr. Palmer formerly had been a general salesman in the Boston office.

- **Eugene B. Mapel**, succeeding Howard G. Marsh, has been appointed manager of sales personnel and training of Carnegie-Illinois Steel Corp.,



NORBERT J. BRENNAN, director of traffic for Chrysler Corp., Detroit.

Pittsburgh. For the past three years Mr. Mapel, as assistant chief of the training division of this U. S. Steel subsidiary, has been active in the development of supervisory and employee training programs. Prior to his transfer to Pittsburgh in 1940, he

was employed for four years at the Gary Sheet & Tin Mill of Carnegie-Illinois at Gary, Ind., as director of training.

- **Emerson G. Gaylor**, for the past year a machine operator at the Bausch Machine Tool Co., has been made chairman of the Chapman Valve Mfg. Co. board to succeed the late Edwin C. Carter. **Ernest Cochran** has been made vice-president and sales manager of the valve company.

- **Roy S. Bain**, president of the Smith Victory Hairpin Corp., Buffalo, has acquired full stock ownership of the company. The plant now is making special tools, jigs and dies for the war program. Mr. Bain came to Buffalo from Cleveland in 1937 to serve as comptroller of the firm.

- **Forest McGuire**, executive head of the Manufacturers' Association of Racine, Wis., has resigned to accept a managerial engineering association in the east. Mr. McGuire was active in the Racine Association of Commerce and other civic interests and served on many industrial state and national boards and committees. He is vice chairman of the industrial relations section of the National Industrial council.

OBITUARY...

- **Elmer A. Conway**, president of Great Lakes Mfg. Co., Wyandotte, Mich., died after a brief illness recently. Mr. Conway was one of the founders of this company. He was 51 years of age.

- **George M. Hendee**, founder of the Indian Motorcycle Co., died recently. He retired as president and treasurer of the motorcycle company in 1916.

- **J. Brooks Fenno**, for many years a partner in the iron and coke brokerage firm of Charles L. Peirson & Co. and later head of J. Brooks Fenno Co., died at his Boston home recently. Mr. Fenno had retired from business some time ago.

- **Thomas R. Ball**, coordinator of transportation at the Electric Boat Co., Groton, Conn., died suddenly June 16. He was 47 years old.

- **Earle D. Parker**, vice-president and general manager of Barber-Colman Co., Rockford, Ill., died recently. Mr. Parker joined Barber-Colman as a mechanical engineer about 40 years

ago. For the past 20 years he was general works manager, was made vice-president last year. He was a director of the Metal Cutting Tool Institute and on the advisory committee on metal cutting tools of the WPB. He was 63 years of age.

- **Joseph Koune Pollock**, for many years a prominent figure in the iron and steel industry, died in Cincinnati recently. Mr. Pollock began his career with the Norton Iron Works, Ashland, Ky., now merged with the American Rolling Mill Co. In 1904 he became a partner in Rogers, Brown & Co., Cincinnati, and remained active in that firm until its dissolution in 1925. Mr. Pollock was president of Union Furnace Co., vice-president of Hanging Rock Iron Co., and a director of the Fourth National Bank, Cincinnati. He had been retired for a number of years.

- **John S. Blakney**, veteran hardware and iron dealer, secretary of the Shadbolt & Boyd Co., Milwaukee, died in a Milwaukee hospital May 9 from a heart ailment, aged 79 years. He was connected with the firm for 40 years and active in Milwaukee civic affairs.

MACHINE TOOLS

... News and Market Activities

Over 100,000 Machine Tools Being Operated by General Motors

Chicago

• • • General Motors Corp. now is operating more than 100,000 machine tools, as compared with 75,000 before the war, C. E. Wilson president of the corporation, reported here last week during an inspection trip of local plants of the automobile company.

Of the 75,000 machines on hand before the war, many were scrapped, several thousand were sold to other plants for war work, with the corporation keeping about 50,000 for its war work. Of the additional 50,000 machines acquired since the war began, the government supplied about 80 per cent, Mr. Wilson said.

Wilson also reported that the corporation was now operating 107 plants in 46 communities in 13 states, employing more than 400,000 people. The Chicago and nearby plants account for 4 to 5 per cent of the corporation's activities. General Motors' plants, in total, cover some 75 million sq. ft. of floor space, with the Chicago Melrose plant accounting for 2½ million sq. ft.

A. P. Sloan, chairman of General Motors, estimated that the automobile company would require \$150,000,000 to reconvert and retool for civilian production after the war.

Unused Small Tools Subject Of WPB Redistribution Plan

Washington

• • • A plan for redistribution of small tools used in production of army ordnance was put before members of the Industrial Supply Distributors Industry Advisory Committee, meeting last week with officials of the Wholesale and Retail Trade Division of WPB.

As outlined to the committee by a representative of the War Department, unused tools available in private and government ordnance arsenals would be routed through regularly established channels to plants needing them for fulfillment of war contracts.

Distributors would be given the opportunity

of purchasing the tools either directly from the War Department or from government contractors and then redirecting them through their normal distribution machinery to industrial plants in their area. As part of the plan, ordnance districts would circulate lists of available tools to manufacturers in their areas and keep them posted on what types of tools were on hand to meet specific requirements.

The committee also discussed at length problems confronting distributors in procurement and retention of sufficient manpower to maintain efficient operations. WPB officials reported that discussions are now being held with the War Manpower Commission to establish a set of operating standards under which certain types of employees might be declared essential.

Lapointe Man Gets Medal For Broach Rifling Methods

• • • In recognition of his invention of the automatic broach rifling machine, Oliver W. Bonnafe, research engineer of the Lapointe Machine Tool Co., Hudson, Mass., recently received the National Metal Trades Association medal for special research and manufacturing processes. Mr. Bonnafe has been associated with the Lapointe company since 1919.

The Lapointe semi-automatic broach rifling machine completes a 0.50 cal. machine barrel in 65 sec., as compared with the time of 55 min. required by the hook cutter rifling machine. The average production of

a set of broaches used in the rifling machine is 3000 barrels. Estimated figures on comparative methods of manufacturing show that the Lapointe broaching method saved \$5,000,000, employment of 470 additional men and 48,000 sq. ft. of floor space in one year's operating time in the manufacture of 3,500,000 barrels.

Another Bonnafe invention has been the automatic breech ring broaching machine which broaches the recesses in breech rings of larger caliber guns such as the 75, 90 and 105 mm. field and anti-aircraft guns. This operation was formerly done by vertical shaping machines and took 65 hr. per breech ring.

Court Rules Barnes Co. Patents Were Not Infringed

Chicago

• • • In late June Federal Judge John P. Barnes ruled that eleven patents of W. F. & John Barnes Co. of Rockford, Ill. had not been infringed by Ex-Cell-O Corp., Detroit, and the International Harvester Co. of Chicago. The patents involve a broad range of automatic hydraulic, electrical and mechanical machine tool controls and some accessories. Six of the eleven patents deal with the application of hydraulic power transmission and control means to machine tools.

Infringements were claimed on patents covering such basic features as unitary construction of hydraulic valves for stopping, starting, reversing and speed control in machine tool systems; spring-loaded working pressure relief valves for diverting or bypassing a portion of the fluid, and the use of a relatively large, low pressure pump for rapid traverse used in conjunction with a smaller, higher-pressure pump for feed. A total of 129 claims were in issue, and all were held invalid. The trial began Sept. 28, 1942. Judge Barnes' 200-page decision indicated that instances of prior invention introduced by the defendants were importantly involved in the general decision of non-infringement.

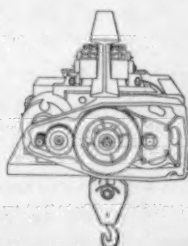
It is understood that the Barnes company will appeal the ruling.

Dealers Change Name

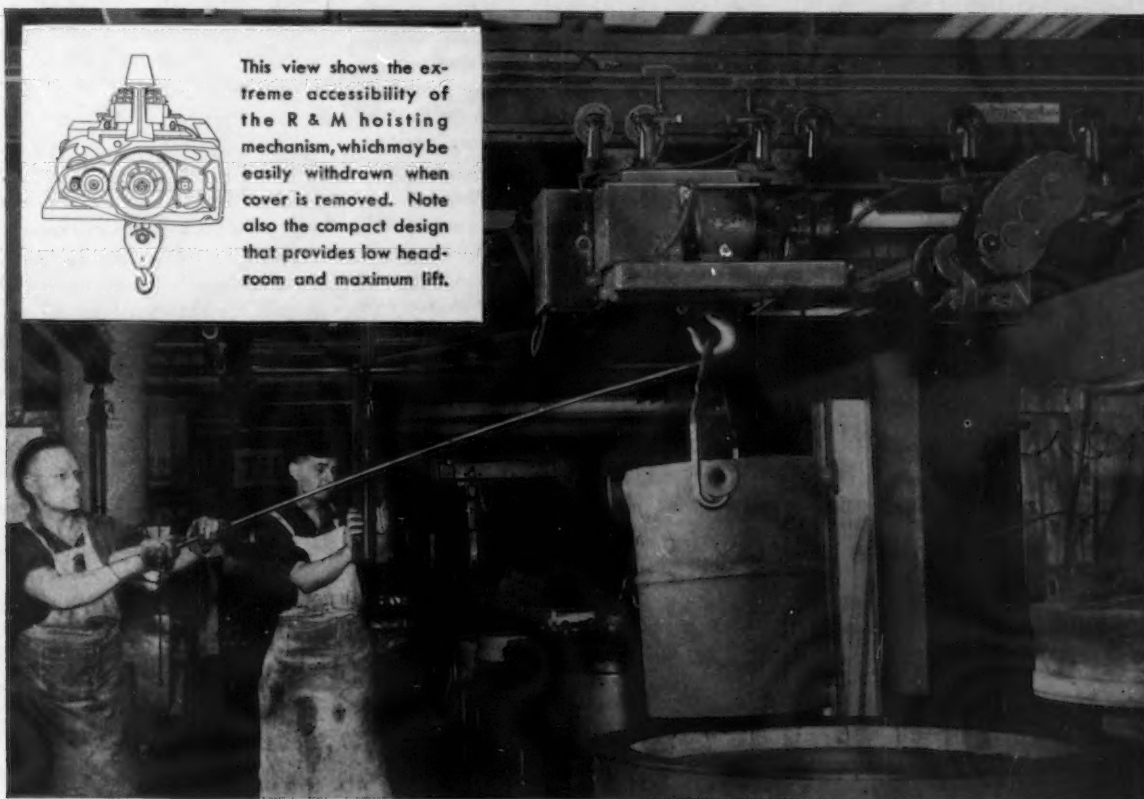
• • • The Associated Machine Tool Dealers of America have voted to change the name of the organization to American Machine Tool Distributors Association. The members approved the change by mail ballot following the association's spring meeting at St. Louis. Dan Harrington, general manager of Harrington-Wilson-Brown, New York, is president of the trade group.

International Business Machines Speeds Work with 41 R & M Hoists!

They're saving time and labor in many departments



This view shows the extreme accessibility of the R & M hoisting mechanism, which may be easily withdrawn when cover is removed. Note also the compact design that provides low head-room and maximum lift.



Around the clock and around the calendar, a squadron of 41 R & M All-Steel Hoists is helping International Business Machines Corporation do a *great* war job. A typical installation is shown above, lifting a heavy ladle in I. B. M.'s heat treating department. The labor of several husky men is saved for other vital work—and the job is done in a fraction of the time.

These hoists help other departments keep humming at top speed, too. They handle raw materials quickly, lift heavy jigs and fixtures with utmost safety, help make machine setup changes in a hurry and keep the finished products rolling from the ship-

ping department to railroad cars.

Here are just a few of the reasons why R & M All-Steel Hoists have "what it takes" for war production. They're precision-built from track to hook; they're powered by famous R & M motors; they're perfectly balanced; they're equipped with an over-size oil-cooled automatic load brake. Hundreds of R & M models, from 1000 to 15,000 lbs. in capacity, are available to fit any application.

Whatever your hoisting problem, "take it up" with R & M! Our expert representatives will help you find the solution. Call the nearest R & M sales and service office, or write us.

R & M HOIST AND CRANE SALES AND SERVICE OFFICES

Albany.....364 Broadway	Denver.....1420 16th St.	New York.....200 Varick St.
Atlanta.....319 Walton Bldg.	Detroit.....2921 E. Grand Blvd.	Philadelphia.....401 N. Broad St.
Baltimore, Lombard & Concord St.	Houston.....3715 Harrisburg Blvd.	Pittsburgh.....H. W. Oliver Bldg.
Boston.....74 Needham St.	Jacksonville.....305 Bisbee Bldg.	Providence.....44 Clifford St.
Chicago.....2400 W. Madison St.	Meriden, Conn.....135 Colony St.	San Francisco, 116 New Mtgmy. St.
Cincinnati.....418 New St.	Newark.....700 Bergen St.	Seattle.....216 Walker Bldg.
Cleveland.....470 Rockefeller Bldg.		Syracuse.....204 State Tower Bldg.
	Montreal.....Lyman Tube & Supply Co., Ltd.	



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NON-FERROUS METALS

... News and Market Activities

Domestic Lead Production May Drop

• • • Because of manpower shortages and other factors, the nation faces a decline in domestic lead production, WPB has revealed.

The optimism of the recent past has suddenly been replaced by a feeling of concern over domestic production following the revelation of changing conditions. At a Lead Industry Advisory Committee meeting held in Washington, June 17, problems created by labor shortages, shipping restrictions and other production hindrances were discussed.

A large lead stockpile which, it appeared, would remain constant is being dug into at an accelerated rate. This stockpile had been increasing in volume for some time, but since the end of March or the early part of April it has begun to dwindle. In addition, domestic production has already declined substantially, one mine reporting a 12 per cent drop in the last 60 days.

While this nation has ample supplies of lead on hand and in production to meet all current and foreseeable military requirements as well as essential civilian needs, conditions are variable and an accelerated decline in production might change the picture drastically since the United States is far from self-sufficient. Large quantities of lead must be imported, principally from Mexico, and current receipts might be increased if shipping permits.

Canada Sets Output Records

Ottawa

• • • Canada will this year break all previous records in the production of non-ferrous metals, C. D. Howe, Minister of Munitions and Supply, told the House of Commons. He stated this result will be achieved by: "The enormous expansion of the aluminum industry; development of a Canadian process for the production of magnesium; extension of recovery operations at large base metal mines; revival of old mines; expansion of existing properties; development and exploitation of marginal and sub-marginal deposits."

Other facts brought to light by the Minister, hitherto closely guarded secrets were: "Canada should be well on the way to self-sufficiency in the production of tungsten in the latter

half of this year; production of molybdenum from two properties, one financed by the government, will provide the major part of the country's requirements; Canada is now exporting mercury in quantity and is one of the important producing countries of the world, whereas prior to the war the country was entirely dependent upon imported supplies; the government owned and operated magnesium plant, using a process developed in Canada, supplies our own needs plus a balance for export and formerly we were entirely dependent on imports of this metal for our supply."

"The aluminum industry in Canada," he said, "possibly provides our most spectacular story of wartime expansion. Canadian output now is more than six times that of 1939, is greater than the total 1939 world production and is equal to 40 per cent of the war requirements of the United Nations.

"In the case of copper, nickel, lead and zinc, the aggregate refined production for 1943 is estimated at 827,800 tons against 662,100 tons in 1939. Canada is now producing 95 per cent of the combined nickel output of the United Nations, 20 per cent of the zinc output, 12.5 per cent of the copper output, 15 per cent of the lead output, 75 per cent of the asbestos output and 20 per cent of the mercury output."

Wire Replacement Procedure

• • • The New York Regional Office of WPB announced June 20 the issuance of a directive by the Copper Division defining the procedure by which wire mill warehouses and wire mills will be able to replace wire deliveries made from their stocks on preference rated orders during the last 10 days of June. Special provision for the 10-day period ending June 30 becomes necessary because of the effectiveness of CMP on July 1.

Heretofore, warehouses have been required to execute form PD-123 for each of their wire mill suppliers to replace deliveries made from stocks on preference rated orders during the one-month period ending on the 20th of each month. According to the directive now issued, this report is to be made to wire mills July 5, to cover

all deliveries made on preference rated orders for AA-5 or higher from May 21 to June 30, inclusive. This report will not be required after that date. Wire mills are instructed to consolidate all Forms PD-123 submitted to them by warehouse and file composite report with WPB by July 10.

Alcoa's Chicago Plant Goes Into Production

• • • The Chicago works of the Aluminum Co. of America, second in size to the North plant at Alcoa, Tenn., began operations June 17. The plant is designed to produce alloy aluminum sheet, as well as special alloy ingots for shipment to other plant making extrusions and forgings.

Distributors' Prices Revised

• • • A new regulation stabilizing distributors' maximum prices for brass mill products and services at October, 1941, levels and permitting the continuation of distributors' mark-ups over mill prices existing at this time up to 3c. a lb. on all items except pipe or water tube, was announced recently by the OPA to be effective at once.

The new regulation No. 408 will effect a "roll-back" in prices and service charges for those distributors who had previously been permitted by the General Maximum Price Regulation to add to mill list prices the differentials they charged in the month of March 1942. These differentials, now limited to 3c. a lb., had risen to 4 and 5c. a lb. in the case of some sellers, and on certain special products had been as high as 15c. a lb. above the mill list price.

The brass mill products for which the regulation establishes maximum prices include sheet, plate, strip, roll, coil, red, bar, tube, pipe, non-electrical wire, and standard extruded shapes fabricated out of copper or copper base alloys, with the exception of items covered by revised price schedule No. 82.

The new maximums for distributors are based on "mill list prices,"—the prices of brass mill products to consumers, calculated by using the base prices and schedules of extras and discounts listed in the price catalogs of the various brass mills.

Refine

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Copper, ele
Copper, Lal
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Zinc, East
Zinc, New
Lead, St. L
Lead, New
Aluminum,
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Magnesium,
Magnesium,
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Plate:
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24S, 24.2

Flat S
3S, 22.7c.
24S, 26.7

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NON-FERROUS PRICES

Refiner, Smelter Quotations

(Cents per lb.)

Copper, electrolytic, Conn. Valley.....	12.00
Copper, electrolytic, New York.....	11.75
Copper, Lake.....	12.00
Tin, Straits, New York.....	52.00
Zinc, East St. Louis.....	8.25
Zinc, New York.....	8.67
Lead, St. Louis.....	6.35
Lead, New York.....	6.50
Aluminum, virgin 99+%, delivered....	15.00
Nickel, electrolytic, base refinery.....	35.00
Magnesium, 99.9+%, carlots.....	21.50
Magnesium, 12-in. sticks, carlots.....	30.00
Cadmium, delivered.....	90.00

ALUMINUM, No. 12 foundry grade (No. 2), 13.50c. per lb.; steel deoxidizing grades, 12.50c. to 13.75c. per lb. ANTIMONY, Asiatic, New York, nominal; American, 14.50c. a lb., f.o.b. Laredo, Tex., smelter. MERCURY, \$191 to \$193 per 76-lb. flask, f.o.b. shipping point or port of entry. BRASS INGOTS, commercial 85-5-5-5 (No. 115), 12.25c. a lb. COBALT, 97 to 99 per cent, \$2.11 per lb. BERYLLIUM COPPER, 3.75 to 4.25 per cent Be, \$15 per lb. contained Be. GOLD, U. S. Treasury, \$35 an oz. IRIIDIUM, 99.5 per cent, \$10 per troy oz. IRIIDIUM, \$165 per troy oz. PALLADIUM, \$24 per troy oz. PLATINUM, \$35 per oz. SILVER, open market New York, 44.75c. per oz. ARSENIC, prime, white, 99 per cent, 4c. per lb.

Copper, Copper Base Alloys

(Mill base prices)

Sheet: Copper, 20.87c.; high brass, 19.48c.; low brass, 80 per cent, 20.15c.; red brass, 85 per cent, 20.36c.; commercial bronze, 90 per cent, 21.07c., 95 per cent, 21.28c.; manganese bronze, 28.00c.; muntz metal, 22.75c.; naval brass, 24.50c.; phosphor bronze, grades A, B, 5 per cent, 36.50c.; Everdur, Herculo, Olympic or equivalent, 26.00c.; nickel silver, 5 per cent, 26.50c.

Rods: Copper, hot rolled, 17.37c.; drawn, 18.17c.; free cutting brass, 15.01c.; low brass, 80 per cent, 20.40c.; red brass, 85 per cent, 20.61c.; commercial bronze, 90 per cent, 21.32c., 95 per cent, 21.53c.; Muntz metal, 18.87c.; naval brass, 19.12c.; phosphor bronze, grades A, B, 5 per cent, 36.50c.; Everdur, Herculo, Olympic or equivalent, 25.50c.; nickel silver, 5 per cent, 28.75c.

Extruded Shapes: Copper, 20.87c.; architectural bronze, 19.12c.; manganese bronze, 24.00c.; Muntz metal, 20.12c.; naval brass, 20.37c.

ALUMINUM

Tubing: 2 in. O.D. x 0.065 in. wall; 2S, 40c. per lb. (1/2H); 52S, 61c. (O); 24S, 67 1/2c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c. per lb.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base price for tubing; 30,000-lb. base price for plate, flat stock. Variations from the above gage, size, temper, finish and quantity require extras.

Extruded Shapes: "As extruded" temper; 2000-lb. base price. 2S and 3S, factor No. 1 to 4, 25.5c. per lb.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2c.

The factor is determined by dividing perimeter of shape by the weight per lineal foot. All prices above are subject to factor number range, temper, length, dimensional tolerances and quantity extras.

Wire, Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2c. per lb.; 1/2 in., 28c.; 3/4 in., 24 1/2c.; 1 in., 23c. Hexagons: 1/4 in., 34 1/2c. per lb.; 1/2 in., 28 1/2c.; 3/4 in., 25 1/2c.; 1 in., 25 1/2c. 2S, as fabricated, random or standard lengths, 1/4 in., 24c. per lb.; 1/2 in., 25c.; 3/4 in., 24c.; 1 in., 24c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in.

thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2c.

Variation from the above size, temper, finish and quantity require extras.

MAGNESIUM

Sheet, rod, tubes, bars and extruded shapes are subject to individual quotation. Magnesium Metal Turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c. a lb.

NON-FERROUS SCRAP METAL QUOTATIONS

Copper, Copper Base Alloy

(Current OPA maximum prices, cents per lb., f.o.b. point of shipment, plus premiums for quantities and special preparation.)

Group 1

No. 1 wire, No. 1 heavy copper..	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper.....	9.75
No. 2 wire, mixed heavy copper.....	8.75
Copper tuyeres.....	8.75
Light copper.....	7.75
Copper borings.....	9.75
Lead covered copper wire, cable..	6.00*
Lead covered telephone, power cable.....	6.04
Insulated copper.....	5.10*

Group 2

Bell metal.....	15.50
High grade bronze gears.....	13.25
High grade bronze solids.....	11.50*
Low lead bronze borings.....	11.50*
Babbitt lined brass bushings.....	13.00
High lead bronze solids.....	10.00*
High lead bronze borings.....	10.00*
Red trolley wheels.....	10.75
Tinny (phosphor bronze) borings.....	10.50
Tinny (phosphor bronze) solids.....	10.50
Copper-nickel solids and borings.....	9.25
Bronze paper mill wire cloth....	9.50
Aluminum bronze solids.....	9.00
Soft red brass (No. 1 composition).....	9.00
Soft red brass borings (No. 1).....	9.00
Gilding metal turnings.....	8.50
Unlined standard red car boxes.....	8.25
Lined standard red car boxes.....	7.75
Cocks and faucets.....	7.75
Mixed brass screens.....	7.75
Red brass breakage.....	7.50
Old nickel silver solids, borings.....	6.25
Copper lead solids, borings.....	6.25
Yellow brass castings.....	6.25

Group 3

Yellow brass soft sheet clippings.....	8.625
Yellow rod brass turnings.....	8.375
Zincy bronze borings.....	8.00
Zincy bronze solids.....	8.00
Fired rifle shells.....	8.25
Brass pipe.....	8.00
Old rolled brass.....	7.75
Admiralty condenser tubes.....	8.00
Muntz metal condenser tubes.....	7.50
Plated brass sheet, pipe reflectors.....	7.50
Manganese bronze solids.....	7.25*
Manganese bronze borings.....	6.25*
	6.50*
	5.50*

Group 4

Automobile radiators.....	7.00
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Group 5

Refinery brass.....	5.00*
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*Price varies with analysis. ¹Lead content 0.00 to 0.40 per cent. ²Lead content 0.41 to 1.00 per cent.

Aluminum

(Current OPA maximum prices, cents per lb., for less than 1000 lb. lots, f.o.b. point of shipment, plus premiums for quantities and special preparation.)

Plant scrap, segregated

2S solids.....	9.00
All other solids.....	8.50
Borings and turnings	
Wrought alloys (17S, 18S, 32S, 52S).....	7.50
High grade alloys.....	7.00
Low grade alloys.....	6.50

Plant scrap, mixed

All solids.....	7.50
Borings and turnings.....	5.50

Obsolete scrap

Pure cable.....	9.00
Old sheet and utensils.....	7.50
Old castings and forgings.....	8.00
Pistons, free of struts.....	8.00
Pistons, with struts.....	6.00
Old alloy sheet.....	7.00

For lots of 1000 to 19,999 lb., add 1c. to above prices except for old castings and forgings, pistons free of struts, pistons with struts and old alloy sheet for which there is a premium of 1/4c. a lb. For lots over 19,999 lb. add 1 1/2c. a lb. to prices listed.

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings.....	8.00

Mixed, contaminated plant scrap

Grade 1 solids.....	11.00
Grade 1 borings and turnings.....	7.00
Grade 2 solids.....	9.00
Grade 2 borings and turnings.....	5.00

For lots over 1499 lb. add 1c. per lb.

Zinc

(Current OPA maximum prices, cents per lb., f.o.b. shipping point.)

New zinc clippings, trimmings.....	7.25
Engravers', lithographers' plates.....	7.25
Old zinc scrap.....	5.75
Unswaged zinc dross.....	5.80
Die cast slab.....	5.80
New die cast scrap.....	4.95
Radiator grilles, old and new.....	4.95
Old die cast scrap.....	4.50

Lead

Soft and hard lead, including cable lead, f.o.b. point of shipment, deduct 0.55c. per lb. from basing point prices for refined metal.

Nickel

Nickel content 98 + per cent, copper under 1/2 per cent, 26c. per lb.; 90 to 98 per cent nickel, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer.....	25%
Electrolytic, full size, 22 1/2c., cut to size.....	30%
Rolled, oval, straight, 15 in. and longer.....	23 1/4
Curved.....	24 1/4
Brass: Cast, 82-20, elliptical, 15 in. and longer.....	23%
Zinc: Cast, 99.99, 16 in. and over.....	16 1/4
Nickel: 99% plus, cast.....	47
Rolled, depolarized.....	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.....	58

Chemicals

(Cents per lb., for quantities, based on delivery from New York City)

Copper cyanide, tech., 100-lb. bbls.....	34
Copper sulphate, 99.5 crystals, bbls. 1-5.....	5.65
Nickel salts, single, 425-lb. bbls.....	13-13.5
Silver cyanide, 100 oz. lots.....	40.82-41%
Sodium cyanide, 96% dom., 100-lb. dms.....	0.15
Zinc cyanide, 100-lb. dms.....	33
Zinc sulphate, 89% crystals, bbls.....	6.8

SCRAP

... News and Market Activities

Blast Furnace Consumption Increases

••• The scrap trade appeared dull last week with only slight variation in any district. Strikes have been making some difference in scrap consumption and demand as shown by the reaction, particularly noticeable in the Pittsburgh district, of mills heavily increasing scrap charges to blast furnaces in an effort to save coke. Open hearth scrap consumption was also reported on the increase due to a desire to speed up heats. Other areas, mean-

For details on a new WPB salvage campaign, see story on p. 96.

while, mainly report interest only in No. 1 heavy melting grades with little interest in inventory building. New England reports some customers demanding equal tonnages of heavy scrap when buying turnings. Also a plan for air raid wardens to collect copper and brass scrap. Tin can collections there are reported down 50 per cent.

An increase in the number of jalopies headed for the scrap pile this year was prophesied by L. R. Cox, OPA car conservation officer in Cleveland, who estimated that 4,000,000 jalopies would be wrecked this year compared with the normal annual rate of 3,000,000. Whether auto graveyards can survive the M-311 order will tell whether this is an important development.

Indications of where scrap is starting to come from are seen in the new order M-1-d outlining the rules for the distribution of aluminum scrap originating in aircraft wreckage and ship repairs.

Inland Head Voices Need for More Scrap

Chicago

••• A warning that despite popular opinion, steel mills will require more scrap in 1944 than in 1942 and 1943 was voiced last week by L. B. Block, vice president and director of purchases of Inland Steel Co. Mr. Block, in a letter to all shippers of scrap to the company, said that he has been quite concerned over the growth of the impression that with added blast furnace capacity now completing less scrap will be needed and asked the scrap yards to exert all possible efforts in again collecting and shipping scrap to the consuming mills in the Chicago district.

CINCINNATI—District scrap dealers indicate that the flow into the yards is definitely disappointing. Even at the slow rate of accumulation, they continue to report that the distressing labor condition is hampering their preparation. Consumer interest seems to be easing somewhat, with some mills refusing all scrap except No. 1 heavy melting steel, while others continue to build inventories.

BUFFALO—Labor shortages continued to harass yard operators this week with little prospect of improvement. Institution of controlled hiring through the USES has not produced a single new worker as none of the yards has a "priority" rating. Operators, however, were hopeful the War Manpower Committee would recognize them as "locally needed," in which case applicants for work would be "referred" to the yards. Meantime, by running into overtime proprietors are maintaining nearly normal operations.

BIRMINGHAM—Steel mills reportedly are showing a little more interest in the obtaining of scrap, but the market in this area still has a long way to go before it again becomes normally active.

BOSTON—Record breaking high temperatures the past week put a decided crimp in yard operations. As a result, New England shipments to consumers were the smallest for any six-day period in a long time.

PITTSBURGH—Extra heavy demand for blast furnace scrap has developed here because of the coal strike. Conservation of coke by increasing scrap charges in the blast furnaces has been heavy. Demand for open hearth scrap is expected to be heavy next month since many companies have substantially increased scrap charges lately in order to make up for lack of hot metal. Dealers scrap supplies are only fair, but industrial scrap flow is good.

PHILADELPHIA—The only change in the scrap picture here has been caused by the short, wildcat strikes in the open hearth department of the Alan Wood Steel Co., making that company suspend shipments during the latter half of the week. Scrap that had been marked for the company was diverted to the district's other producers.

NEW YORK—The prolonged heat wave has decreased considerably the collection of scrap. Those yards which depend on manpower instead of equipment have been hit hardest by the extreme weather. Barges are being loaded with scrap for Buffalo and one large eastern Pennsylvania mill is accepting scrap on allocation.

ST. LOUIS—The scrap movement to this market is spotty with Arkansas and western Missouri showing an improvement. The flooded sections still feel the effects of the rivers which are receding. Dealers report stocks are accumulating because of shortage of labor. Mills are estimated to average about two weeks' supply.

CLEVELAND—Scrap in this district is moving rapidly, with some mills reporting that they could even use more turnings if they were available. This is partly because of an increased use of turnings in blast furnaces, production in which is being pushed to help make up for those furnaces down for repairs.

Scrap Workers' Tested Rates Set

Cleveland

Upon the recommendation of the regional chief of the Scrap Processors Branch of the WPB Salvage Division, the regional WLB fixed minimum tested rates for scrap dealers in the Cleveland, Dayton, Columbus, and Cincinnati, Ohio, and Louisville Ky., areas. The rates are those above which the WLB will not approve increases except in accordance with the "Little Steel" formula, and were applied in deciding applications for approval of voluntary wage increases from 25 scrap dealers.

The Rates

	CENTS PER HOUR				
	A	B	C	D	E
Common Labor.....	\$0.70	\$0.70	\$0.65	\$0.60	\$0.55
Shearmen.....	.80	.80	.75	.70	.65
Metal Sorters.....	.80	.80	.75	.70	.65
Drop Pitmen.....	.80	.80	.75	.70	.65
Truck Drivers.....	.85	.80	.75	.70	.65
Acetylene Torch Burners.....	.90	.90	.80	.75	.70
Baling Press Operators.....	.85	.95	.85	.80	.75
Crane Operators.....	1.15	1.05	1.00	.90	.85

(A) Cleveland, (B) Dayton, (C) Columbus, (D) Cincinnati, (E) Louisville.

SCRAP PRICES

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

(All Prices Are Per Gross Ton)																		
	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES					Low Phos.		Heavy Structural and Plate			Foundry Steel					
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Bk. Shts. No. 1 & 2 Bundles No. 1 Busheling	Unbald* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Billet, Bloom, and Cast Steel	Bar Crops, Punchings Plate Scrap	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crank-shafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. Electric First Furnace Cut Bundles		
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton, Cleveland, Middletown, Cincinnati, Portsmouth, Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point, Ashland, Ky., Buffalo, N. Y., Bethlehem, Pa.; Kokomo, Ind., Duluth, Minn., Detroit, Mich., Toledo, Ohio, St. Louis, Mo., Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco, Minnequa, Colo., Seattle, Wash.	\$20.00 19.50 18.75 19.50 19.25 18.25 18.00 17.85 17.50 17.50 17.00 16.50 14.50	\$15.00 14.50 13.75 14.50 14.25 13.25 13.00 12.85 12.50 12.00 11.50 9.50	\$15.00 14.50 13.75 14.50 14.25 13.25 13.00 12.85 12.50 12.00 11.50 9.50	\$16.00 15.50 14.75 15.50 15.25 15.25 14.00 14.85 14.50 13.00 12.50 10.50	\$17.00 16.50 15.75 16.50 16.25 15.75 15.00 14.85 14.50 14.00 13.50 11.50	\$17.50 17.00 16.25 17.00 16.75 15.75 15.50 15.35 15.00 14.50 14.00 12.00	\$25.00 24.50 23.75 24.50 24.25 23.25 23.00 22.85 22.50 22.00 21.50 19.50	\$22.50 22.00 21.25 22.00 21.75 20.75 20.50 20.35 20.00 19.50 19.00 17.00	\$21.50 21.00 20.25 21.00 20.75 19.75 19.50 19.35 19.00 18.50 18.00 16.50	\$22.00 21.50 20.75 21.50 21.25 20.25 20.00 19.85 19.50 19.00 18.50 16.50	\$22.50 22.00 21.25 22.00 21.75 20.75 20.50 20.35 20.00 19.50 19.00 17.00	\$21.50 21.00 20.25 21.00 20.75 19.75 19.50 19.35 19.00 18.50 18.00 16.00	\$22.00 21.50 20.75 21.50 21.25 20.25 20.00 19.85 19.50 19.00 18.50 16.00	\$21.00 20.50 19.75 20.50 20.25 19.25 19.00 18.85 18.50 18.00 17.50 15.00	\$18.00 17.50 16.75 17.50 17.25 16.25 16.00 15.85 15.50 15.00 14.50 12.50	\$19.50 19.00 18.25 19.00 18.75 17.75 17.50 17.35 17.00 16.50 16.00 14.00	\$21.00 20.50 19.75 20.50 20.25 19.25 19.00 18.85 18.50 18.00 17.50 15.50	

*Baled turnings are \$5 per gross ton higher.

BUNDLES: Tin can bundles are \$4 below dealers' No. 2 bundles. No. 3 bundles are \$2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is \$15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Minimum set at \$14 per gross ton at any shipping point in U. S. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrows Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakmont, Cal. Claymont, Del., includes the switching point of Chester, Pa. Chicago includes Gary, Ind., switching district.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above

for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be \$3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made \$4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

NEW LISTED GRADES: Priced in dollars per gross ton less than No. 1 heavy melting steel. Pit scrap, ladle skulls, slag reclaim, etc., of 85% or more Fe priced—\$2; 75 to 85% Fe—\$4; under 75% Fe—\$8 per ton. Mill scale of 65% or more Fe—\$8 per ton. Mill cinder and grindings, shipping point maximum price of \$4 per gross ton at all U. S. shipping points.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c.

*At Memphis 50c.; Great Lakes ports \$1; New England \$1.25.

RAILROAD SCRAP							CAST IRON SCRAP			
	Scrap Rails			Scrap Rails				Group A	Group B	Group C
	No. 1 RR Heavy Melting	Scrap Rails	Rails for Re-rolling	3 ft. and Under	2 ft. and Under	18 in. and Under				
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown, Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown, Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco, Buffalo, Detroit, Duluth, Kansas City, Mo., Kokomo, Ind., Seattle, St. Louis	\$20.50 21.00 21.00 19.75 18.00 20.25 18.85 19.00 17.00 19.25 15.50 18.50	\$21.50 22.00 22.00 20.75 19.00 21.25 19.85 20.00 18.00 20.25 18.50 19.50	\$23.00 23.50 23.50 22.25 20.50 22.75 21.35 21.50 19.50 21.75 18.00 21.00	\$23.50 24.00 24.00 22.75 21.00 23.25 21.85 22.00 20.00 22.25 18.50 21.50	\$23.75 24.25 24.25 23.00 21.25 23.50 22.10 22.25 20.25 22.50 18.75 21.75	\$24.00 24.50 24.50 23.25 21.50 23.75 22.35 22.50 20.50 22.75 19.00 22.00	No. 1 cupola cast, Clean auto cast, Unstripped motor blocks, Stove Plate, Heavy Breakable Cast, Charging Box Size Cast, Misc. Malleable	\$18.00 18.00 15.50 17.00 15.50 17.00 20.00	\$19.00 19.00 16.50 18.00 16.50 18.00 21.00	\$20.00 20.00 17.50 19.00 17.50 19.00 22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B: switching district of Kansas City, Kan., Mo.

Tool Steel Scrap Ceiling Prices Set by MPR 379, May 4, 1943

BASE PRICE SEGREGATED			BASE PRICE UNSEGREGATED SOLIDS		BASE PRICE UNSEGREGATED TURNINGS	
	Solids, Lb. Cont. W	Turnings, Lb. Cont. W				
Type 1	\$1.80	\$1.60	\$1.50 per lb. contained W if 5% or more.		\$1.30 per lb. contained W if 5% or more.	
Type 2	1.60	1.40	\$1.15 per lb. contained W if over 1% and less than 5%.		\$1.00 per lb. contained W if 1% and less than 5%.	
Type 3	1.25	1.25				
Type 4*	0.125	0.105	\$0.80 per lb. contained Mo if 1 1/4% or more.		\$0.70 per lb. contained Mo if 1 1/4% or more.	
Type 5*	0.135	0.115				

*Per lb. of scrap material.

Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	June 29, 1943	June 22, 1943	June 1, 1943	June 30, 1942
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates.....	2.10	2.10	2.10	2.10
Plates, wrought iron....	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)

Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic...	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)

Merchant bars.....	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars.....	2.70	2.70	2.70	2.70
Structural shapes.....	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00
Wrought iron bars.....	4.40	4.40	4.40	4.40

Wire and Wire Products: (Cents Per Lb.)

Plain wire.....	2.60	2.60	2.60	2.60
Wire nails.....	2.55	2.55	2.55	2.55

Rails:

(Dollars Per Gross Ton)

Heavy rails.....	\$40.00	\$40.00	\$40.00	\$40.00
Light rails.....	40.00	40.00	40.00	40.00

Semi-Finished Steel:

(Dollars Per Gross Ton)

Rerolling billets.....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars.....	34.00	34.00	34.00	34.00
Slabs.....	34.00	34.00	34.00	34.00
Forging billets.....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)

Wire rods.....	2.00	2.00	2.00	2.00
Skelp (grvd).....	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 154 and 165.

Pig Iron:

(Per Gross Ton)

	June 29, 1943	June 22, 1943	June 1, 1943	June 30, 1942
No. 2 fdy., Philadelphia..	\$25.84	\$25.84	\$25.89	\$25.89
No. 2, Valley furnace...	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti...	24.68	24.68	24.68	24.68
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.39	25.39	25.39	25.39
Basic, Valley furnace....	23.50	23.50	23.50	23.50
Malleable, Chicago†.....	24.00	24.00	24.00	24.00
Malleable, Valley.....	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago...	31.34	31.34	31.34	31.34
Ferromanganese.....	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap:

(Per Gross Ton)

Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go.....	20.00	20.00	20.00	20.00

Coke, Connellsville:

(Per Net Ton at Oven)

Furnace coke, prompt...	\$6.50	\$6.50	\$6.50	\$6.00
Foundry coke, prompt...	7.50	7.375	6.875	6.875

Non-Ferrous Metals:

(Cents per Lb. to Large Buyers)

Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake, New York.	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	52.00
Zinc, East St. Louis....	8.25	8.25	8.25	8.25
Lead, St. Louis.....	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic.....	35.00	35.00	35.00	35.00
Magnesium, ingot.....	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

Composite Prices . . .

FINISHED STEEL

June 29, 1943.....	2.25513c. a Lb.....	23.61
One week ago.....	2.25513c. a Lb.....	23.61
One month ago.....	2.25513c. a Lb.....	23.61
One year ago.....	2.26190c. a Lb.....	23.61

HIGH

1943.....	2.25513c.,	2.25513c.,
1942.....	2.26190c.,	2.26190c.,
1941.....	2.43078c.,	2.43078c.,
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16
1939.....	2.35367c., Jan. 3	2.26689c., May 16
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2
1933.....	1.95578c., Oct. 3	1.75836c., May 2
1932.....	1.89196c., July 5	1.83901c., Mar. 1
1931.....	1.99626c., Jan. 13	1.86586c., Dec. 29
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9
1929.....	2.31773c., May 28	2.26498c., Oct. 29

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON

.....	23.61 a Gross Ton.....	23.61
.....	23.61 a Gross Ton.....	23.61
.....	23.61 a Gross Ton.....	23.61
.....	23.61 a Gross Ton.....	23.61

HIGH	LOW
\$23.61	\$23.61
23.61	23.61
\$23.61, Mar. 20	\$23.45, Jan. 2
23.45, Dec. 23	22.61, Jan. 2
22.61, Sept. 19	20.61, Sept. 12
23.25, June 21	19.61, July 6
23.25, Mar. 9	20.25, Feb. 16
19.74, Nov. 24	18.73, Aug. 11
18.84, Nov. 5	17.83, May 14
17.90, May 1	16.90, Jan. 27
16.90, Dec. 5	13.56, Jan. 3
14.81, Jan. 5	13.56, Dec. 6
15.90, Jan. 6	14.79, Dec. 15
18.21, Jan. 7	15.90, Dec. 16
18.71, May 14	18.21, Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

SCRAP STEEL

.....	\$19.17 a Gross Ton.....	\$19.17
.....	\$19.17 a Gross Ton.....	\$19.17
.....	\$19.17 a Gross Ton.....	\$19.17
.....	\$19.17 a Gross Ton.....	\$19.17

HIGH	LOW
\$19.17	\$19.17
19.17	19.17
\$22.00, Jan. 7	\$19.17, Apr. 10
21.83, Dec. 30	16.04, Apr. 9
22.50, Oct. 3	14.08, May 16
15.00, Nov. 22	11.00, June 7
21.92, Mar. 30	12.67, June 9
17.75, Dec. 21	12.67, June 9
13.42, Dec. 10	10.33, Apr. 29
13.00, Mar. 13	9.50, Sept. 25
12.25, Aug. 8	6.75, Jan. 3
8.50, Jan. 12	6.43, July 5
11.33, Jan. 6	8.50, Dec. 29
15.00, Feb. 18	11.25, Dec. 9
17.58, Jan. 29	14.08, Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point ↓ Product												10	DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes ²	3.80¢		3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.36¢	5.32¢
Electrolytic tin plate, box	\$4.50		\$4.50												
Black plate, 29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ¹²			3.37¢
Mfg. ternes, special box	\$4.30	\$4.30	\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢ ¹³	2.25¢	2.39¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢ ¹³	2.25¢		2.47¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					2.99¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massillon, Canton = 2.70¢)					2.80¢			
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.35¢		2.45¢	2.65¢	2.31¢	2.29¢	2.15¢
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)					3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)							
WIRE ⁹															
Bright ¹⁵	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)				3.10¢			2.92¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)				3.70¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

¹ Mill run sheets are 10c, per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also shafting. For quantities of 20,000 to 29,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹¹ Boxed. ¹² Portland and Seattle price, San Francisco price is 2.50c. ¹³ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILING—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points, Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMIFINISHED STEEL—Follansbee Steel Corp. may sell forging billets at \$49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at \$34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at \$34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at \$50 at established basing points and slabs at \$41; Empire Sheet and Tin Plate may sell slabs at \$41 at established basing points and sheet bars at \$39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge \$41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge \$36 per ton for small billets, f.o.b. Portsmouth and \$37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

PRICES

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, 2300	Hot Rolled, 3100	Cold Drawn, 2300	Cold Drawn, 3100
*Philadelphia	\$3.518	\$4.872 ^s	\$5.018	\$3.922	\$4.772	\$3.605	\$3.666	\$3.822	\$4.072		\$7.116		
*New York	3.590	4.613 ²	5.010	3.974 ⁶	4.774	3.768	3.758	3.853	4.103	6.008	7.158	7.303	8.453
*Boston	3.774	4.744	5.224	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.312	7.344	8.494
*Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.082				
*Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165				
*Washington	3.596	4.841	5.196	4.041	4.741	3.796	3.930	3.941	4.041				
*Chicago	3.25	4.20	5.23 ⁴	3.60	4.65 ⁸	3.55	3.55	3.50	3.75	5.75	6.90	6.85	8.00
*Milwaukee	3.38	4.33 ²	5.27 ⁴	3.73	4.78 ⁸	3.68	3.68	3.68	3.88	5.88	7.03	6.98	8.13
*Cleveland	3.35	4.40	4.977	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.106	6.85	8.00
*Buffalo	3.35	4.40	4.75 ⁴	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.90	6.85	8.00
*Detroit	3.45	4.50	5.00 ⁴	3.70	5.908 ⁸	3.609	3.661	3.45	3.80	6.08	7.23	7.159	8.309
*Cincinnati	3.425	4.475 ²	4.825 ¹	3.675	4.711	3.611	3.691	3.611	4.011				
*St. Louis	3.397	4.247 ²	5.172 ⁴	3.747	4.931 ⁸	3.697	3.697	3.647	4.031	6.131	7.281	7.231	8.381
*Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	7.15	6.85	8.25
*St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Indianapolis	3.45	4.25	5.01 ¹	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	4.77	5.52 ¹	4.20		4.15	4.15	4.10	4.42				
Birmingham	3.45 ³		4.75 ¹	3.70 ³		3.55 ³	3.55 ³	3.50 ³	4.43				
Memphis	3.85	4.66	5.25	4.10		3.95	3.95	3.90	4.31				
New Orleans	3.95	4.95	5.25	4.20		3.90	3.90	4.10	4.60				
Houston	3.75	5.43	5.25	4.30		5.25	5.25	3.75	4.50				
Los Angeles	4.95	7.15	5.95	4.90		4.90	4.60	4.35	5.70	9.55	8.55	10.55	9.55
San Francisco	4.55	7.55	6.60	4.50		4.65	4.35	3.95	5.55	9.80	8.80	10.80	9.80
Seattle	4.65 ⁷	6.63	5.70 ⁷	4.25		4.75	4.45	4.20	5.75		8.00		

N. E. STEELS

(Hot Rolled Mill Extras for Alloy Content)

Designa- tion	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Man- ganese	Phos- phorus Max.	Sulphur Max.	Silicon	Chro- mium	Nickel	Molyb- denum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/.33	1.60/1.90	.040	.040	.20/.35				.10c	\$2.00		
NE 1335	.33/.38	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1340	.38/.43	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1345	.43/.48	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1350	.48/.53	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 6020	.18/.23	1.00/1.30	.040	.040	.20/.35			.10/.20	.45	9.00	.95c	\$19.00
NE 8442*	.40/.45	1.30/1.60	.040	.040	.20/.35			.30/.40	.90	18.00	1.40	28.00
NE 8613	.12/.17	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8615	.13/.18	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8617	.15/.20	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8620	.18/.23	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8630	.28/.33	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8635	.33/.38	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8637	.35/.40	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8640	.38/.43	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8642	.40/.45	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8645	.43/.48	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8650	.48/.53	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8720	.18/.23	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.20/.30	.80	16.00	1.30	26.00
NE 9255	.50/.60	.70/.95	.040	.040	1.80/2.20				.40c	8.00		
NE 9260	.55/.65	.75/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9262	.55/.65	.75/1.00	.040	.040	1.80/2.20	.20/.40			.65	13.00		
NE 9415	.13/.18	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30c	\$26.00
NE 9420	.18/.23	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9422	.20/.25	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9430	.28/.33	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9435	.33/.38	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9437	.35/.40	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9440	.38/.43	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9442	.40/.45	1.00/1.30	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.85	17.00	1.35	27.00
NE 9445	.43/.48	1.00/1.30	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.85	17.00	1.35	27.00
NE 9450	.48/.53	1.20/1.50	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.85	17.00	1.35	27.00
NE 9537*	.35/.40	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9540*	.38/.43	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9542*	.40/.45	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9550*	.48/.53	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9630	.28/.33	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9635	.33/.38	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9637	.35/.40	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9640	.38/.43	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9642	.40/.45	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00
NE 9645	.43/.48	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00
NE 9650	.48/.53	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over; Exceptions: ¹ 500 to 1499 lb. ² 400 to 1499 lb. ³ 400 to 3999 lb. ⁴ 450 to 1499 lb. ⁵ 1000 to 1999 lb. ⁶ 1500 to 1999 lb. ⁷ 300 to 10,000 lb. ⁸ 2000 to 39,999 lb. At Philadelphia galvanized sheets, 2500 more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb.; galvanized and cold rolled sheets, 750 to 4999 lb.; cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lbs.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations.

† Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

†† For zoned cities these grades have been revised to NE 8617-20.

‡ For zoned cities these grades have been revised to NE 9442-45 Ann'd.

* Base delivered prices according to price zones established by Amendments to RPS 49 including the 3% transportation tax—not including the 6% freight increase of March 18, 1942, rescinded May 15, 1943.

*Recommended for large sections only. Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton on semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, \$5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; f.o.b. Duluth, billets only, \$2 higher. Delivered prices do not reflect new per cent tax on freight rates.

	Per Gross Ton
Rerolling	\$34.00
Forging quality	40.00
Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton	\$54.00

Shell Steel

	Per Gross Ton
1 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.	
Prices delivered Detroit are \$2.00 higher.	

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57 1/2 c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 1c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 202
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

A WAR OF

Movement

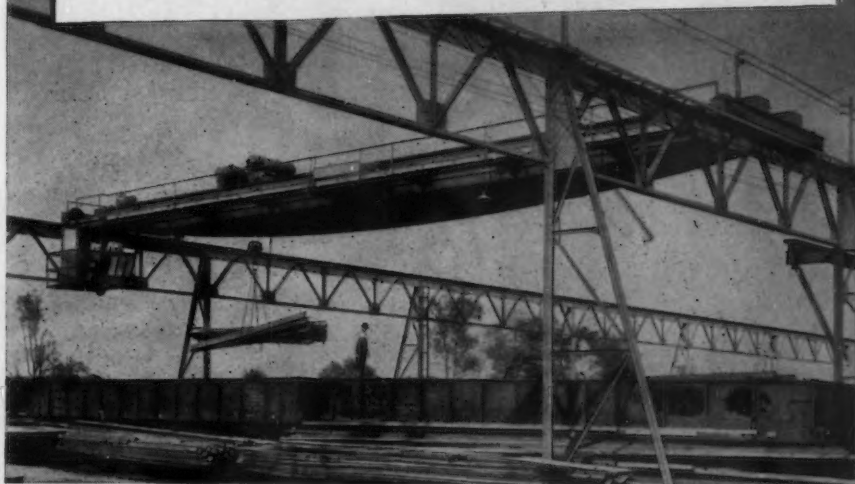
BEGINS AT HOME

The job of seeing to it that materials and supplies are at the right place at the right time is no less important on the home front than on the battle fronts. Industrial schedules *must* be maintained if war objectives are to be gained.

Shepard Niles has long enjoyed the reputation of manufacturing the most complete line of cranes and hoists in America. Because of this and because they are specialists, manufacturing *only* cranes and hoists, they are in a position to recommend the proper type of equipment for any materials-handling problem you may have.

Overhead Electric Traveling Cranes are made in either welded or riveted box girder construction, in capacities from 1 ton to 450 tons. Representatives in or near all war production centers are available for consultation to help you determine where important materials-handling economies can be made.

Write for descriptive literature.



Typical 4-Motor, Cab-Operated, Over-running Electric Traveling Crane in yard service. Because all operating parts are completely sealed against dust, dirt and moisture, Shepard Niles Cranes and Hoists are equally serviceable indoors or out.

Shepard Niles

CRANE & HOIST CORPORATION

356 SCHUYLER AVE. • MONTAUR FALLS, N. Y.

PAGE for WIRE



Today's production of **PAGE WIRE**, of course, is directed to the war effort and to essential industry—whether it be Stainless Steel Shaped Wire, Carbon Steel Shaped Wire, Welding Wire or such general items as Spring Wire, Bond Wire, Telephone Wire, etc.

As examples: (1) the springs used in a rifle that has attained a world-wide reputation for its performance in battle, are Page Stainless Steel Spring Wire; and (2) a special electrode developed by Page for welding armor—a contribution to the production of tanks.

★ ★ ★

Although completely occupied with the war effort, you will find our organization well able to work with you on plans you may have for the use of wire after the war.

PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, Denver, Los Angeles, New York, Pittsburgh, San Francisco, Portland



In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT • CONNECTICUT

PRICES

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Per Cent Off List
½ in. & smaller x 6 in. & shorter...	65½
9/16 & ¾ in. x 6 in. & shorter...	63½
¾ to 1 in. x 6 in. & shorter...	61
1 ¼ in. and larger, all length...	59
All diameters over 6 in. long...	59
Lag, all sizes...	62
Plow bolts...	65

Nuts, Cold Punched or Hot Pressed:

	(Hexagon or Square)
½ in. and smaller...	62
9/16 to 1 in. inclusive...	59
1 ¼ to 1 ½ in. inclusive...	57
1 ½ in. and larger...	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller...	64	
½ in. and smaller...	62	
¾ in. through 1 in.		60
9/16 to 1 in.	59	
1 ¼ in. through 1 ½ in.	57	58
1 ½ in. and larger	56	

In full container lots, 10 per cent additional discount.

Stove Bolts

Packages, nuts loose	71 and 10
In packages, with nuts attached.....	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (½ in. and larger)

	Base per 100 lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75

Small Rivets (7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws

	Per Cent Off List
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes....	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	\$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points) Per Gross Ton	
Light rails (from billets)	\$40.00
Light rails (from rail steel)	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

PRICES

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh) Per Lb.

Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	\$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbed wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe) Base Price—\$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	25	3½
¾ in.	30	10
1 and 1½ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe fobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

Our troops use
landing barges

which

STANDARD
forgings
help to
build



Whether for battleship or submarine, gun mount or tank, locomotive or industrial equipment, all Standard steel forgings and castings being used directly or indirectly in the war effort have a vital something in common. That something is the same high quality for which Standard products have been known in peace and war since the early beginnings of the company 148 years ago.

It is the kind of quality which Standard obtains by first producing acid open-hearth steel and then keeping every manufacturing process under rigid control right through to the finished forging.



STANDARD
STEEL WORKS

DIVISION OF
THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA



FORGINGS • CASTINGS • WELDLESS RINGS • STEEL WHEELS

PRICES

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	\$25.00	\$24.50	\$26.00	\$26.50		
Brooklyn	27.50			28.00		
Jersey City	26.53	26.03	27.53	27.03		
Philadelphia	25.84	25.34	26.84	26.34	\$30.74	
Bethlehem, Pa.	25.00	24.50	26.00	25.50		
Everett, Mass.††	25.00	24.50	26.00	25.50		
Swedeland, Pa.	25.00	24.50	26.00	25.50		
Steelton, Pa.		24.50			29.50	
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	
Sparrows Point, Md.	25.00	24.50				
Erie, Pa.	24.00	23.50	25.00	24.50		
Neville Island, Pa.	24.00	23.50	24.50	24.00		
Sharpville, Pa.*	24.00	23.50	24.50	24.00		
Buffalo	24.00	23.00	25.00	24.50	29.50	
Cincinnati, Ohio	23.94	23.94		25.11		
Canton, Ohio	25.39	24.89	25.89	25.39	32.69	
Mansfield, Ohio	25.94	25.44	26.44	25.94	32.86	
St. Louis	24.50	24.50				
Chicago	24.00	23.50	24.50	24.00	35.46	\$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00	22.42	
Hamilton, Ohio	24.00	23.50		24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown*	24.00	23.50	24.50	24.00	22.42	
Detroit	24.00	23.50	24.50	24.00		
Lake Superior fc.					\$28.00	
Lyles, Tenn. fc.†					33.00	
St. Paul	26.76		27.26	26.76	39.80	
Duluth	24.50	24.00	25.00	24.50		
Birmingham	20.38	19.00	25.00			
Los Angeles	26.95					
San Francisco	26.95					
Seattle	26.95					
Provo, Utah	22.00	21.50				
Montreal	27.50	27.50		28.00		
Toronto	25.50	25.50		26.00		

GRAY FORGE IRON: Valley or Pittsburgh furnace\$23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at \$1 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge \$30 for charcoal iron at its Delta, Mich., furnace.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

Metal Powders

Prices are based on current market prices of ingots plus a fixed figure. For ton lots f.o.b. shipping point, in cents per lb.

Copper, electrolytic, 150 and 200 mesh	21½ to 23¼c.
Copper, reduced, 150 and 200 mesh	20½ to 25¼c.
Iron, commercial, 100 and 200 mesh	13½ to 15c.
Iron, crushed, 200 mesh and finer.	4c.
Iron, hydrogen reduced, 300 mesh and finer	63c.
Iron, electrolytic, unannealed, coarser than 300 mesh	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh	42c.
Iron, carbonyl, 300 mesh and finer	90c.
Aluminum, 100 and 200 mesh.	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	\$1
Chromium, 150 mesh	\$1.00
Lead, 100, 200 & 300 mesh, 11½ to 12¼c.	
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh, 8½c. plus metal	
Tin, 100 mesh	58¾c.

*Freight allowed east of Mississippi.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

			Seamless	Lap	
			Cold	Weld	
			Drawn	Hot	
			Rolled	Rolled	
2	in. o.d. 13	B.W.G.	15.03	13.04	12.35
2½	in. o.d. 12	B.W.G.	20.21	17.54	16.58
3	in. o.d. 12	B.W.G.	22.48	19.50	18.35
3½	in. o.d. 11	B.W.G.	28.37	24.62	23.15
4	in. o.d. 10	B.W.G.	35.20	30.54	28.56
(Extras for less carload quantities)					
40,000	lb. or ft. and over				Base
30,000	lb. or ft. to 39,999	lb. or ft.	5%		
20,000	lb. or ft. to 29,999	lb. or ft.	10%		
10,000	lb. or ft. to 19,999	lb. or ft.	20%		
5,000	lb. or ft. to 9,999	lb. or ft.	30%		
2,000	lb. or ft. to 4,999	lb. or ft.	45%		
Under 2,000	lb. or ft.		65%		

LEWIN-MATHES *Got the right answer at*

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from ¾" to 4" and the experience to help you get the most out of this type of machine.



IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING...

Ask ETNA
About Swaging

ETNA
MACHINE COMPANY
TOLEDO OHIO

PRICES

CAST IRON WATER PIPE

Per Net Ton

4-in. and larger, del'd Chicago.....	\$54.80
4-in. and larger, del'd New York....	52.20
4-in. and larger, Birmingham	46.00
4-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
4-in. and larger f.o.b. cars, Seattle. 71.20	

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

Per Gross Ton

Old range, bessemer, 51.50	\$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorous, 51.50	4.35

*Adjustments are made to indicated prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

COKE

Furnace

Per Net Ton

Connellsville, prompt	\$6.50*
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Foundry

Connellsville, prompt	\$7.50
Fayette County, W. Va. (Beehive) ..	\$8.10
By-product, Chicago	\$12.25
By-product, New England	\$13.75
By-product, Newark	\$12.40 to \$12.95
By-product, Philadelphia	\$12.38
By-product, Cleveland	\$12.30
By-product, Cincinnati	\$11.75
By-product, Birmingham	\$8.50†
By-product, St. Louis	\$12.02
By-product, Buffalo	\$12.50

Maximum by-product coke prices established by OPA became effective Oct. 1, 1941.

*Hand-drawn ovens using trucked coal are permitted to charge \$7.00 per net ton, plus usual transportation. Maximum bee-hive furnace coke prices established by OPA, Feb. 8, 1942. †F.o.b. oven.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	\$25.00
Domestic, f.o.b. Ohio River landing barges	25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	25.00

REFRATORIES

(F.o.b. Works)

Fire Clay Brick

Per 1000

Super-duty brick, St. Louis	\$64.60
First quality, Pa., Md., Ky., Mo., Ill. 51.30	
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 46.55	
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania & Birmingham	\$51.30
Chicago District	58.90
Silica cement, net ton (Eastern) ..	9.00

Chrome Brick

Per Net Ton

Standard, chemically bonded, Balt., Plymouth Meeting, Chester	\$54.00
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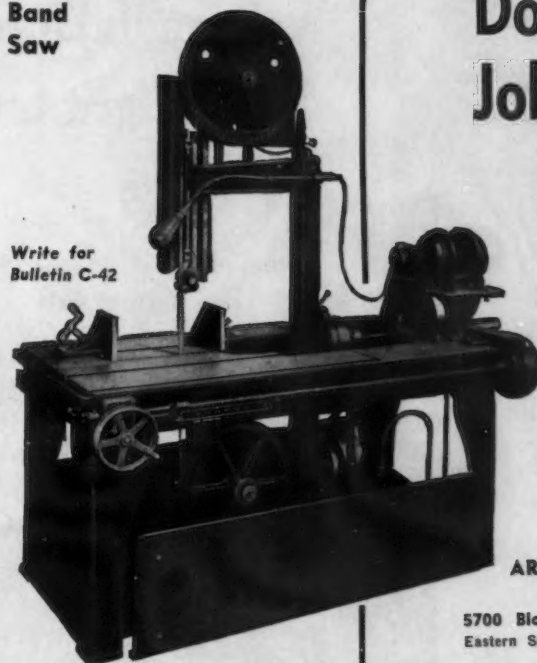
Magnesite Brick

Standard, Balt. and Chester	\$76.00
Chemically bonded, Baltimore	65.00

Sain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	\$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

Marvel No. 8 Metal-Cutting Band Saw



Write for
Bulletin C-42

Doing its War Job Well!

The busiest tool in the tool rooms, an essential tool in the complete die shop and a time and money saver in the maintenance department, because "it does all things well." The MARVEL No. 8 Metal Cutting Band Saw (capacity 18" x 18") will snip off an 1/2" drill rod, rough out the largest billet or cut a perfect 45° mortise on the end of a large I-beam without any special setting-up. Its large planer type bed takes all work. Its continuous blade feeds into the work at any angle from 45° right to 45° left. It has a large removable vise and a combination hand and/or power feed.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave., Chicago, U.S.A.
Eastern Sales Office: 225 Lafayette St., New York



Symbol OF INTEGRITY

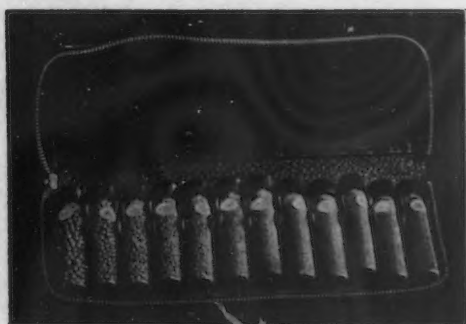


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DIVISION

PLANT AT SHARON, PA.

Plate and Welding Division
GENERAL AMERICAN TRANSPORTATION CORPORATION
SHARON, PA.



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We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

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Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.



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Manchester, New Hampshire

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New York Office, 114 Liberty Street

FERROALLOY PRICE

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, duty paid, 80%, per gross ton (carloads) \$11.00
Delivered Pittsburgh \$11.00
F.o.b. Southern furnaces \$11.00

For packed carloads, add \$6 per ton; \$10 for ton; \$13.50 for less than ton; \$18 for less than 200 lb.

Electrolytic Manganese

99.9%+, less ton lots, per lb. 20c
Ton lots 15c
Annual contracts 15c

Spiegeleisen

(Carlots, per gross ton, Palmerton, Pa.)
Domestic, 19 to 21% \$24.00
Domestic, 26 to 29% \$24.00

Electric Ferrosilicon

OPA maximum base price cents per Si contained, lump size, f.o.b. shipping point with freight allowed to destination. Roman type indicates bulk car lots, italics l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
50% silicon	6.65c.	7.10c.	7.25c.
	7.85c.	9.70c.	8.25c.
75% silicon	8.05c.	8.20c.	8.75c.
	9.05c.	9.65c.	10.25c.

Spot sales 45c. per lb. higher for 75% Si; 30c. for 75% Si. For extras and premiums see MPR 405.

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 \$)
F.o.b. Jackson, Ohio \$21.00
Buffalo \$21.00

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

*Official OPA price established Jan. 24, 1941.

Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

Ferrosilicon

(65-72% Cr; 2% max. Si; lump)
OPA maximum base contract prices per lb. of contained Cr, f.o.b. shipping point with freight allowed to destination.

Roman type are carload prices in bulk; italics are l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
0.03% carbon ..	25.00c.	25.40c.	26.00c.
0.06% carbon ..	23.00c.	23.40c.	24.00c.
	24.00c.	24.65c.	25.00c.
0.10% carbon ..	22.50c.	22.90c.	23.50c.
	23.50c.	24.15c.	24.50c.
1.00% carbon ..	20.50c.	20.90c.	21.50c.
	21.50c.	22.15c.	22.50c.
2.00% carbon ..	19.50c.	19.90c.	20.50c.
	20.50c.	21.15c.	21.50c.

Spot prices are 1/4c. higher per lb. contained Cr. For extras and premiums see MPR 407.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	14.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	14.85c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% silicon.

	Eastern Zone	Central Zone	Western Zone
Car Lots ...	3.35c.	3.50c.	3.65c.

Spot prices 1/4c. higher per lb. of briquet. For premiums and extras see MPR 405.

Silicomanganese

(Per gross ton, delivered, carloads, bulk)
3.00 carbon \$120.00
2.50 carbon 125.00
2.00 carbon 130.00
1.00 carbon 140.00

Briquets, contract, basis carlots, bulk freight allowed, per lb. 5.80c.
Packed 6.05c.
Less-ton lots 6.55c.

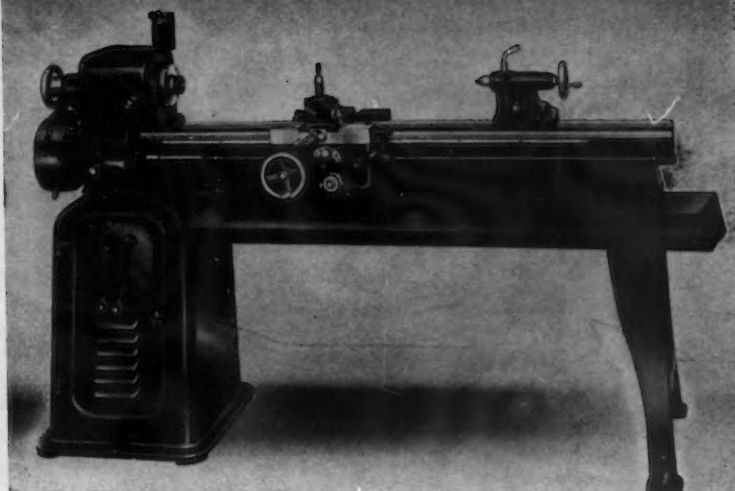
*Spot prices are \$5 per ton higher.
†Spot prices 1/4c. higher.

PRICES

Other Ferroalloys

Ferrotungsten, delivered, carlots, per lb. contained tungsten ...	\$1.90
Tungsten metal powder, 98%-99%, any quantity, per lb.	\$2.60
Ferrovanadium, 35%-40%, contract basis, f.o.b. producers plant, usual freight allowances, open-hearth grade, per lb. contained vanadium	\$2.70
Special grade	\$2.80
Very special grade	\$2.90
Vanadium pentoxide, 88%-92% V ₂ O ₅ technical grade, contract basis, any quantity, per lb. contained V ₂ O ₅	\$1.10
Ferroboron, contract basis, 17.50 % boron minimum, f.o.b. Niagara Falls, carlots, per lb. alloy	\$1.20
Ton lots	\$1.25
Silicaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	23c.
Silvaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	40c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 100 lb. and over, maximum based on rate to St. Louis, per lb.	45c.
Bortam, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Borosil, 3% to 4% boron, 40 to 45% silicon, f.o.b. Philo, Ohio, per pound contained boron	\$7.00
Ferrocolumbium, 50% to 60%, f.o.b. Niagara Falls, ton lots, per lb. contained columbium ..	\$2.25
Less-ton lots	\$2.30
Ferrotitanium, 40%-45%, f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained titanium	\$1.23
Less-ton lots	\$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	\$1.35
Less-ton lots	\$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore & St. Louis, per gross ton.	\$142.50
3%-5% carbon	\$157.50
Ferrophosphorus, 18% electric or blast furnace, f.o.b. Anniston, Ala. carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton	\$75.00
Ferromolybdenum, 55-75 per cent, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum ...	95c.
Calcium molybdate, 40%-45%, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo.....	80c.
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb. Under 100 lb.	\$2.60
.....	\$3.00
Zirconium, 35-40%, contract basis, carloads in bulk or package, per lb. of alloy	15c.
Less-ton lots	16c.
Zirconium, 12-15%, contract basis, carlots, bulk, per gross ton.	\$102.50
Packed	\$107.50
Less-ton lots	\$112.50
Alsilfer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, per lb.	7.50c.
Ton lots	8c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, carlots, freight allowed, per lb.	10.50c.
Less-ton lots	11c.

SHELDON



BBU-1240 WQ PRECISION LATHE

This quality 12 in. ball bearing tool room lathe is built for precision work and will retain its accuracy under long and hard usage. It has extra collet capacity (to 1" round) the finest precision ball or roller bearings obtainable, an improved heavy-duty, double wall apron with power cross feed; full quick change gears and full bowl headstock. Its improved Sheldon 4-speed,

V-belt, lever-clutch operated, underneath motor drive is entirely enclosed in the pedestal leg and has antifriction bearings. It is so designed that spindle belts operate thru a standard 1-piece bed. This bed is bridge-braced with heavy cross girts and has hand scraped ways—2 V-ways and 2 flat ways. If interested in 10", 11" and 12" quality lathes be sure to see the SHELDON.

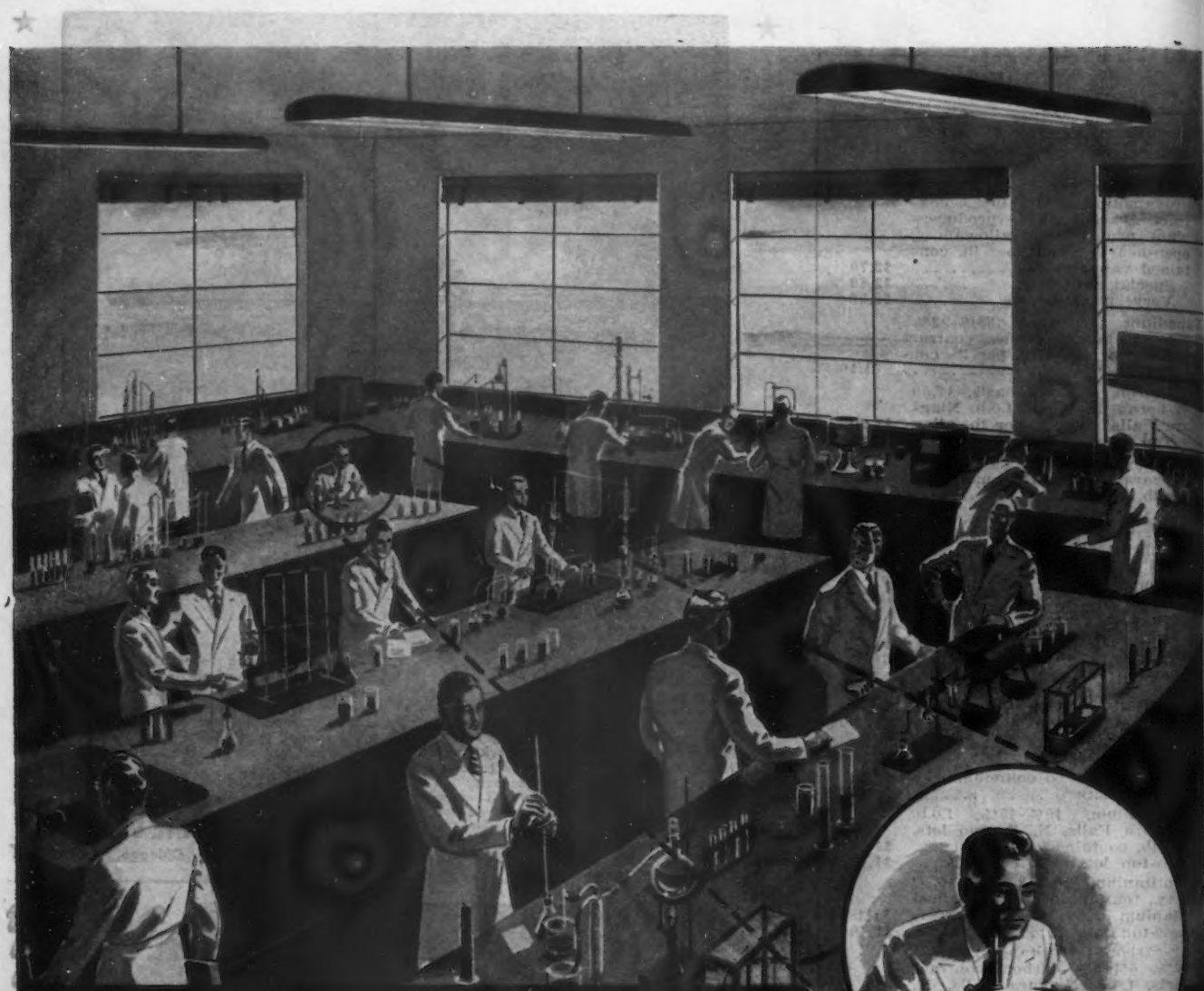
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The man who never makes the headlines...

HE'S ONLY a laboratory assistant, one of those humble toilers whose names never make the news. But he's played a mighty important part in making possible the scientific achievements that have made his superior's name a household word.

In the records of American industrial achievements, too, there are many who labor—and willingly—in behind-the-scenes obscurity. The Joyce name, for instance, may not be known to the man in the street, but it is a familiar

name to a large and growing number of America's largest industrial plants. For the parts, assemblies, machines and products, assembled and built by Joyce engineers and craftsmen are helping many war-busy plants to achieve production records that win awards and headlines.

Much of Joyce's facilities are now devoted to assemblies and large-scale production of precision parts for the Army, Navy and leading war plants—but the ingenuity of Joyce's engineer-

ing staff is still available to others with war production problems. Whether part or product, if it can be made better, faster, cheaper, more efficiently, Joyce "know how" will find the way.

A Joyce representative will be glad to explain in detail the unique advantages we can offer.

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Machine Company

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FOR ALL KEY INDUSTRIES

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